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ABSTRACT

As Americans strive to reform and restructure schools and design programs that prepare young people for a new century, education policy and practice must be guided by the best that is known about education and all areas of inquiry related to learning, schooling, and young people. The academy suggests ways in which the organization and character of research can be changed to improve its application to policy and practice. Also, the answers to our education problems are found in creating new connections between what is discovered through research and what schools and teachers do in their policies, procedures, and instructional practices. The report presents a national research agenda focusing on five priority areas expected to spark positive changes in schools. These areas include: (1) active learning over the lifespan; (2) assessment; (3) bolstering achievement of historically underserved "minority" and impoverished groups; (4) school organization; and (5) the connection to teachers and teaching. The report provides concrete examples of some of the best research that has been done in the last 20 years, pointing to the major breakthroughs influencing schooling and classroom practice, including cooperative learning, school finance, reading and writing, educating students with disabilities, grade retention, and testing. Examined in detail are the levels and types of funding for educational research. The recommendations for action involve funding and support, quality control, the organization of research, incentives for researchers, and linking research to practitioners. (RR)

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Research and the Renewal of Education

A REPORT FROM THE NATIONAL ACADEMY OF EDUCATION

Project On Funding Priorities
For Educational Research

Funded by The Carnegie Corporation of New York

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What is at stake is our vision of the kinds of human beings we would hope Americans to be in the last years of the twentieth and the first years of the twenty-first centuries, and of the kinds of education that will help bring those human beings into existence.

Lawrence A. Cremin (1925-1990)
Popular Education and its Discontents

EXECUTIVE SUMMARY AND RECOMMENDATIONS

As Americans strive to reform and restructure schools and design programs that prepare young people for a new century, education policy and practice must be guided by the best that is known about education and all areas of inquiry related to learning, schooling, and young people.

According to the National Academy of Education (NAE), an honorary society of 75 of the nation's most distinguished researchers and education leaders, current efforts to implement broad-based school reforms without adequate research to guide the direction of change will fail. "Pushing for change without continuing to deepen our understanding of what we are doing will only intensify the problems we seek to solve," the study says.

"Pushing for change without continuing to deepen our understanding of what we are doing will only intensify the problems we seek to solve."

The study asserts that if we want well-designed institutions, good leadership, high standards, and strong public support for education, we need imaginative research that anticipates the future, takes on the biggest challenges, and is funded to support the most promising areas where breakthroughs are likely to occur.

The Academy suggests ways in which the organization and character of research can be changed to improve its application to policy and practice. The report presents a national research agenda focusing on five priority areas expected to spark positive changes in schools. These include:

- **Active Learning Over the Lifespan.** Research must be designed to understand how students can be intellectually engaged and encouraged to solve challenging problems as individuals and as a group—the kind of learning they will use in the real world. Research must focus on ways to help students take initiative, construct meaning for themselves, and develop thinking skills in new and unfamiliar settings. The Academy underscores the fact that learning exists outside of schools and that research must embrace education in its broadest contexts—including learning that takes place within families, communities, and in other settings.

"Research must embrace education in its broadest contexts—including learning that takes place within families, communities, and in other settings."

- **Assessment.** As educators debate the need for new forms and applications of testing, a major investment is needed to develop new educational assessments. Research should improve the instructional relevance of testing, probe the social contexts of learning, and foster a rich view of thinking and creativity.
- **Bolstering Achievement of Historically Under-served, "Minority," and Impoverished Groups.** More research is needed on the educational opportunities

afforded to members of historically under-served, "minority," and impoverished groups, on the implications of their social and cultural contexts for learning, and on the institutional arrangements that prove most effective in expanding educational opportunities for such groups.

- **School Organization.** We need further inquiry into the social organization of schooling and inner workings of schools as institutions. More research is needed to clarify how effective learning is organized, whether within school or beyond. The Academy notes that the present structure of schools constrains the dissemination of innovations based on research and that new organizational structures hold promise for more widespread use of research.

- **Connection to Teachers and Teaching.** Connecting theory to practice is more than examining instructional effectiveness or devising new forms of professional development. It also means placing research in the service of teaching and school improvement. Teachers and researchers must be collaborators in constant communication with each other, but this will involve new roles for teachers and students, according to the Academy.

The study, funded by the Carnegie Corporation of New York, was directed by Michael Kirst of Stanford University and Diane Ravitch of Columbia University's Teachers' College. The executive director and principal writer of the study was Thomas James of Brown University.

"While researchers have not developed the equivalent of antibiotics or hybrid corn, investigations conducted in universities and in schools themselves have played a crucial role in shaping the structure and content of schooling and in deepening our understanding of the education process."

The study argues that while researchers have not developed the equivalent of antibiotics or hybrid corn, investigations conducted in universities and in schools themselves have played a crucial role in shaping the structure and content of schooling and in deepening our understanding of the education process. Education research has led to fundamental reorientations in our knowledge of human development, learning theory and its applications, testing and assessments, the nature of disabilities, and curriculum design. "Education research has led schools to turn 'good' practice into 'best' practice," the report says.

Today, researchers are bringing new understandings in areas such as the process of reading, the craft of writing, the growth of reasoning skills, and the nature of cultural differences in learning that are leading to significant improvements in education. In addition, research is helping to shape public policy, such as in the design and implementation of mandates for equitably financed school systems in the states.

"The research base is underfunded, limited in focus, and lacks connection to what happens in classrooms."

The Academy argues that the answers to our education problems lie in creating new connections between what is discovered through research and what schools and teachers do in their policies, procedures, and instructional practices.

But the promise of research in shaping educational change, the Academy notes, is limited by constraints within and outside the research community. The research base is underfunded, limited in focus, and lacks connection to what happens in classrooms. Research studies tend to be short-term and conducted in isolation, the report says.

The report provides concrete examples of some of the best research that has been done in the past 20 years, pointing to major breakthroughs influencing schooling and classroom practice, including cooperative learning, school finance, reading and writing, educating students with disabilities, grade retention, and testing.

The report notes that current efforts to change the way schools are organized and administered could provide new opportunities for these research findings to be spread more widely throughout the nation. But research cannot advance the process of change unless there is adequate funding for investigations.

Funding for research through the National Institute of Education (NIE)—for many years the largest source of research support—has been decimated since 1973, the peak funding year. Between 1973 and 1986, the year the NIE was eliminated, funding dropped nearly 80 percent before being adjusted for inflation, and there has been no significant increase since the NIE was replaced by the Office of Educational Research and Improvement.

Depending on how research activity is defined, the U.S. Department of Education spends between 100 and 200 million dollars for research through its principal units established for that purpose. In comparison with fields such as defense, health care, energy, and agriculture, the nation spends little on disciplined inquiry and research-driven experimentation for improving education.

Research initiated and designed entirely by scholars in universities, school districts, and other agencies is grossly underfunded. Only $2-million of the 1992 budget request for the Office of Educational Research and Improvement covers field-initiated research, and even this small amount represents a 100 percent increase over last year (see Table 4 on page 24). Consequently, the entire field-initiated research program of the Department of Education supports about 15 to 17 one-year grants.

Foundations, which have the power to spark innovation by setting funding priorities, tend to fund "action projects" that can be widely franchised with limited research on comparative effectiveness and affordability. Several leading foundations that previously championed research have withdrawn support in favor of these demonstration projects that do not examine which aspects of the projects are or are not successful and the conditions necessary to allow such experiments to flourish.

According to an NAE survey conducted for this report, less than four percent of grants from 28 major foundations are targeted for education research. Less than 15 percent of grants categorized specifically as education-related goes to education research.

One of the major problems in research is that few policy makers understand what comprises good research. In policy and funding circles, R&D often signifies "replication

"Foundations, which have the power to spark innovation by setting funding priorities, tend to fund 'action projects' that can be widely franchised with limited research on comparative effectiveness and affordability."

and dissemination" rather than "research and development," the report says. Much of our research is really government-funded evaluations of existing programs or monitoring small-scale pilot projects.

RECOMMENDATIONS FOR ACTION

The NAE report presents a clear national agenda for education research that can make a profound and lasting contribution to constructive educational change. The Academy seeks to create a bolder, more forward-looking agenda focused on thoughtful inquiry in high-priority areas.

The following recommendations go beyond "what" needs to be studied to examine "how" the education research enterprise can be strengthened through specific actions to increase funding and support, improve quality control, better organize research support, provide stronger incentives for researchers, and infuse the best that research has to offer into policy and practice.

Funding and Support

The Academy recommends that overall research funding for education be increased from current expenditures. Today education research receives only about one half a percent of the total aggregate $300 billion spent on U.S. educational institutions at all levels (about $150 million). Many knowledge-producing industries spend anywhere from 4 to 6 percent of their operating budgets on research and development.

The federal government, foundations and corporations, and state governments that provide the majority of research support should target much of their increased spending for research to the areas most likely to lead to school improvement — new research on assessment; active learning across the lifespan; the achievement of disadvantaged, under-served populations, and minority groups; school organization; and connecting research to the work and lives of practitioners.

Quality Control

The need for consensus building and developing quality control for research is especially important today as society continues to devote substantial resources to experiments in educational change.

To control the quality of research and advocate its importance in policy, the NAE urges further study on the viability and value of a National Panel of Reviewers to advise the federal R&D effort, proposing consensus on what is known and recommending new studies to close

gaps in the research base. The panel would deliberate with educational scholars and practitioners on the meaning of the existing research and clinical findings and propose guidelines for practice. Funded by public and philanthropic sources, the panel would be analogous to panels in other professions that make authoritative statements about the results of research.

The panel would recommend ways of ensuring greater quality control in research on education while also creating more comprehensive and imaginative strategies for research support.

Organization of Research

The NAE believes that to improve the federal role in education R&D, a better balance must be achieved between research initiated by federal agencies for research centers and regional laboratories, and research initiated by scholars in the field. Field-initiated research must be bolstered to help stimulate imaginative responses to education problems and spark new and unexpected approaches to teaching and learning. Many of the areas of research where great successes have been made, such as in studies of student retention and in the education of children with disabilities, have emerged directly from research initiated by scholars in the field.

Other areas of remarkable progress in the past two decades, such as cooperative learning and reading, have benefitted from both programmatic research at federally supported centers and field-initiated investigation.

Educators and policy makers must address serious education problems in a systematic fashion over a sustained period at reasonable funding levels. We must provide adequate support for federally authorized and funded research, particularly in fields where problems have been well identified and a strong community of researchers has developed a range of approaches. The proper development of a new national system of examinations, for example, is likely to emerge from combinations of federally authorized research and field-initiated research.

While the report did not seek to make specific recommendations on the organization of research support at the federal level, NAE surveys of researchers, academic administrators, and others revealed widespread concern about federal research administration. According to survey respondents:

- National research policy should be designed to encourage strong interagency arrangements and to integrate education research goals with other social, economic and health services.
- Federal sponsors of centers for research and development should make larger and longer commitments for study and experimentation on critical issues in American education.
- Federal research sponsors should permit more latitude for the initiation of research agendas from outside of the government's decision-making agencies, devoting more

funds to field-initiated studies and basic research to generate new insights concerning education.

- A renewed federal role in research, along with an increased role by the states, will be needed to support the large-scale studies required in conjunction with efforts to restructure and improve schooling.
- There is a need to expand and stabilize support for long-term data collection efforts in which multi-wave, large-sample surveys should be combined with close-in field work studies of schools and classrooms.
- There should be an equitable division of federal research funds to support (1) research centers to carry out long-term studies on issues of perennial concern, (2) grant programs targeted at emerging issues, providing funds for smaller scale, shorter studies; and (3) a program to support field-initiated studies.
- Priorities should be built around pressing problems where there is a likely research payoff and promising strategies are suggested, including the establishment of working relationships among researchers, educational practitioners, and policy makers.
- Clear incentives are required if researchers are to be engaged seriously with educational practitioners, and concomitant incentives will be needed for school districts and even for state agencies to collaborate on research and development.
- In addition to centers, labs, and field-initiated research, incentives should be given to states and districts to mount coordinated efforts with scholars and scientists; policy making for national and state entities should consider the establishment of sites where research, development, and practice can occur as an integrated whole.
- To avoid the danger of politicization at the federal level, a model similar to that of the National Science Foundation with a distinguished governing board is worth exploring for research on education.
- As conditions of funding, agencies could require more long-term projects, more coordination among research projects and between research and development projects, and a certain proportion of the research aimed directly at altering practice.
- The federal government can help to build emerging fields of research as well as promising lines of policy and program development by investing in centers of excellence, including expanded support of graduate students and postdoctoral fellowships.

Further study and discussion, involving many other organizations and agencies, will be needed to reach firm conclusions. The Academy is firmly committed to supporting that process, particularly the Committee on the Federal Role in Educational Research, recently established under the National Academy of Sciences.

Incentives for Researchers

New incentives are needed to draw talented young people into the field of education research, including scholars from disadvantaged and minority groups. Colleges and universi-

ties must do more to support, recognize, and reward education research by providing new or additional incentive grants, fellowships, summer stipends, travel allowances, and awards for special projects aimed at addressing problems of educational practice, both within and beyond academic institutions. Academe can make a major contribution by giving added weight to field research and contributions to practice in tenure decisions.

Foundations can develop programs to support young researchers, particularly for research efforts aimed at promoting school improvement or addressing the five research priorities outlined in this report.

Corporations, and knowledge-based corporations in particular, might wish to sponsor new research fellowships in collaboration with universities and local school districts as a gesture of support for the research enterprise and out of their commitment to school improvement.

Linking Research to Practitioners

To continue the transformation of schools where the best practice occurs routinely in every classroom, new and lasting connections must be developed between researchers, policy makers, and school practitioners.

Teachers and other education practitioners need to become active partners and critical users of education research. Without such partnerships research remains ineffectual.

Overall, there needs to be much more cross-fertilization of ideas and findings between researchers, teachers, and other groups. Funders can insist that experimental programs have strong research components and that the studies they support address how the investigation might affect policy and practice. What are the broader questions the research helps to answer? How does the study advance what we already know and lead to improvement? These questions and examinations of the factors leading to success and failure are likely to stimulate future improvements in research and education.

Funders must also support longer-range studies so that complex agendas of inquiry and action can achieve some of their objectives before being cast aside. Stronger incentives must be created for translating research findings into workable adaptation models in policy and practice across different settings. And we need better mechanisms for consolidating scattered research efforts and communicating them authoritatively beyond specialized communities of scholars.

Consensus-building panels and other forms of deliberation can be useful in drawing together different strands of research and to pressing for integrated concept development that will support improvements in policy, practice, and public understanding.

There has been agreement, both within and without the ranks of educators, that systematic investigation has much to offer... Massive, lasting changes in education cannot safely be made except on the basis of deep objective inquiry.

Lee J. Cronbach, Patrick Suppes
Research for Tomorrow's Schools
National Academy of Education, 1969

I. INTRODUCTION

As a nation that sees education as central to the cultivation of human freedom, Americans naturally feel a sense of urgency when attempting to revitalize our schools. We look to our schools to create opportunity and equality in a diverse and stratified society; to conserve what we cherish and to develop our powers of adaptation and exploration; and to prepare citizens and workers for challenging jobs, some of which have not been invented yet.

All our goals—from economic competitiveness to expanding frontiers of knowledge, from personal well-being to social justice—are closely tied to the success of our attempts at educational renewal.

But designing new institutions for a new century will require more than just building 21st Century Schools on 19th Century models. We must examine age-old conceptions about learning, about how to deliver education, and about how to structure our schools, bringing into the process of change the best that is known about teaching, learning, and young people.

It is not enough to build; we must think anew. Efforts to "restructure" schools, to develop plans that give parents greater choice over the schools their children attend, and new uses of testing, for example, could just as easily prove disastrous as beneficial. How will these and other changes affect student achievement, educational opportunity, and school effectiveness—and at what cost? Do the proposals work better under some conditions than in other circumstances? We need solid research to tell us which experiments work best and under what conditions, and why particular aspects of demonstration projects succeed or fail.

Effective change has never resulted from willy nilly innovation. To push for change without continuing to deepen our understanding of what we are doing will only intensify the problems we seek to solve. Public policy, with its quick-fix approaches and shifting priorities, will fail if pressing education concerns are addressed without engaging our most highly developed capacities for critical insight and social imagination. If we want well-designed institutions, good leadership, high standards, and public support for education, then we will also need imaginative research, just as we do in other vital endeavors that shape modern life, such as industrial technology and medical practice.

To achieve our goals, we must continue to improve our knowledge of how learning takes place, while also promoting the strategies most productive for sustaining it. We must probe as deeply as possible into the dispositions of the different kinds of people we educate,

"Designing new institutions for a new century will require more than just building 21st Century Schools on 19th Century models."

"We need solid research to tell us which experiments work best and under what conditions, and why particular aspects of demonstration projects succeed or fail."

"If we want well-designed institutions, good leadership, high standards, and public support for education, then we will also need imaginative research."

providing them the direction, curriculum, and learning strategies they will need to meet the future with confidence.

While education researchers have not developed the equivalent of antibiotics or hybrid corn, their investigations have helped shape the structure and content of schooling and helped deepen our understanding of the education process. Education research has led to fundamental reorientations in our knowledge of human development, learning theory and its applications, testing and assessments, the nature of disabilities, and curriculum design.

RESEARCH IN PRACTICE:
Cooperative Learning

One of the most talked about approaches to teaching and classroom management today, cooperative learning methods grew out of research by psychologists and sociologists investigating effects of group learning on achievement and social development and out of attempts to invent more complex learning tasks. Several different forms have been designed and investigated.

The cooperative learning methods break classes into small groups of students, usually of mixed abilities, and encourages them to help one another learn. Grading and grouping procedures give students a stake in each other's progress.

Researchers note that cooperative learning promotes higher achievement, develops social skills, and puts the responsibility for learning on students. Such methods build student interest and ensure that every student makes a contribution to the group's success. In many classes, students are assigned specific roles, such as "checker," who probes to see whether everyone can explain what the group has done, "observer," who records the group's activities, and "summarizer," who keeps track of group decisions.

Schools are using cooperative learning methods to promote racial and cultural diversity, to develop critical thinking skills, to implement peer coaching, to integrate students with disabilities into the mainstream, and even in collaborative management of the school.

Our understanding of how the variety of cooperative learning methods work has grown out of many kinds of research. Studies have been conducted by federally sponsored research centers, through field-initiated investigation, and by local school districts examining their own practices.

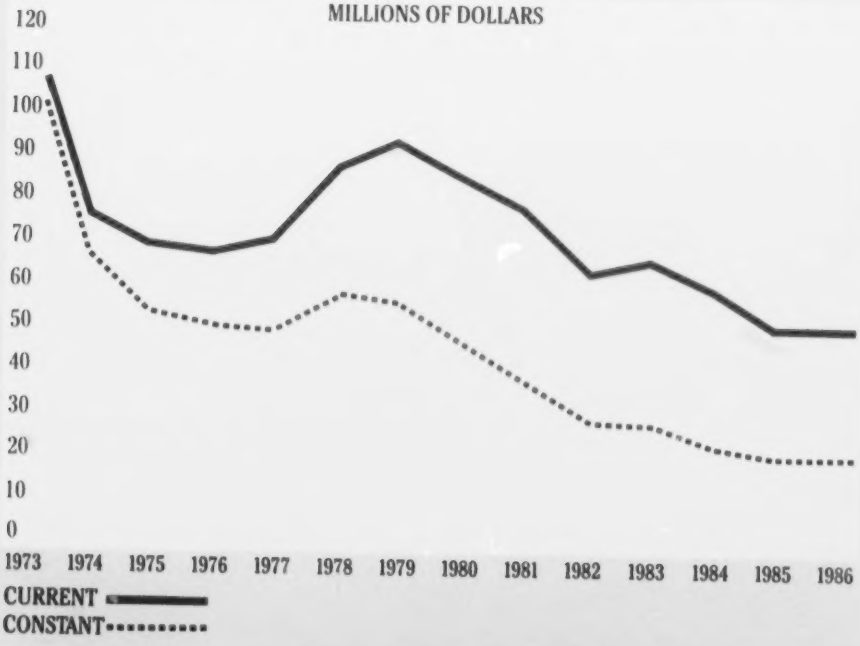
Cooperative learning is a complex instructional approach requiring significant support from school administrators, collegial interaction among teachers, and new learning materials. Because cooperative learning requires substantial training and school reorganization, observers say that only about six percent of schools have fully implemented cooperative learning programs. These methods are thus a prime example of one of the key findings of the NAE report—new research is needed on changing school organization to support better use of research. The best practices, the report says, cannot penetrate into classrooms until changes are made in how classrooms are organized and supported.

Today, researchers are bringing new understandings in areas such as the process of reading, the craft of writing, the growth of reasoning skills, and the nature of cultural differences in learning that are leading to significant improvements in education. In addition, research is helping to shape public policy, such as in the design and implementation of mandates for equitably financed school systems in the states. **(Throughout this report, we cite other examples of areas where research has helped improve schools and classrooms.)**

In spite of the benefits of research for students, schools, and society, and in spite of the millions of dollars spent over the last decade on school reform, funding for research has declined drastically in recent years.

FIGURE 1

Research Support from the National Institute of Education in Current and Constant Dollars for Fiscal Years 1973-86*



*Constant 1972 dollars were computed by using the implicit price deflator for federal government purchases of goods and services as reported in *Survey of Current Business.*

Source: U.S. General Accounting Office, *Education Information: Changes in Funds and Priorities Have Affected Production and Quality,* November 1987, p. 69.

"In spite of the benefits of research for students, schools, and society, and in spite of the millions of dollars spent over the last decade on school reform, funding for education research has declined drastically in recent years."

While the costs of education generally rose faster than inflation in recent times, spending on education research fell precipitously between the early 1970s and the late 1980s. Between 1973 and 1986, the funds available for research through the National Institute of Education—the federal government's principal agency for education research during those years and the country's single most significant source of research support for education—dropped 79 percent before inflation, as shown in Figure 1 on the preceding page.

In comparison with its support of research in other fields, particularly those related to defense, health care, energy and agriculture, this nation spends little on disciplined inquiry and research-driven experimentation for improving education. As shown in Table 1, education ranks disastrously low among federal priorities for research and development:

TABLE 1

Research and Development in Major Federal Departments and Agencies, 1988
(in millions of dollars)

Department of Defense	39,112
Health and Human Services	6,187
[National Institutes of Health]	[5,458]
Energy	4,863
NASA	4,159
National Science Foundation	1,604
Agriculture	999
Interior	370
Environmental Protection Agency	352
Commerce	314
Transportation	306
Veterans Administration	209
Agency for International Development	171
Education	**130***
All Other	324
Total	59,108

Source: Arthur D. Sheekey, "Federal Support for Educational R & D," Office of Research, Education Information Resources Division, Office of the Assistant Secretary for Educational Research and Improvement, U.S. Department of Education; estimates taken from *Special Analysis of the 1988 Budget*, J-5, Office of Management of Budget.
*Does not include funds for dissemination, demonstration projects, or facilities.

Underfunding of research from other sources, including states, corporations, and foundations further hampers our nationwide efforts to revitalize education.

Foundations devote only a small portion of their funds for education and a minuscule amount for education research. An NAE survey of 28 major foundations that support education discovered that less than four percent of the grants went to education research, broadly defined. Roughly 15 percent of grants categorized specifically as education-related went to education research.

In making this estimate, we took the broadest possible construction of education research, including not only formal research within academic disciplines, but also policy studies, evaluations, surveys, and other information-gathering activities. Even with this large net for capturing an estimated amount for research funding, it appears that disciplined inquiry,

"Foundations devote only a small portion of their funds for education and a minuscule amount for education research."

"Disciplined inquiry is but a small speck on the broad social vision of foundations."

RESEARCH IN PRACTICE:
Reading

Research on how young people learn to read and write has had a profound effect on changing what educators know about teaching these fundamental learning activities.

The National Academy of Education's report Becoming a Nation of Readers (1985) identified how research has changed our awareness of what reading is so that educators and parents can help students learn to read more effectively.

In recent years, researchers have determined that reading is much more than managing to pronounce words or understand higher level constructions. Readers do not simply move from identifying letters, words, and paragraphs to gain meaning from a text. Rather, reading is a constructive process in which readers interpret what they find in terms of what they already know.

This discovery has led educators to the realization that phonics instruction should go hand-in-hand with opportunities to identify words in meaningful sentences and stories. Phonics should be kept simple and taught early and not be dragged through the grades, researchers say.

New discoveries in reading have affected the design of teaching materials, workbooks, primers, self study lessons, and efforts to teach reading across the curriculum. A few school districts have even begun to turn away from basal readers and use children's literature to teach reading.

As a result of research, educators also have greater understanding about the role of parents and institutions out of school—libraries, TV, museums—in developing reading and literacy.

Unfortunately, the 1985 NAE reading study came to the same conclusion as the 1991 research study: while there is broad consensus on these issues, the findings have not significantly affected the use of basal readers, composition texts, or traditional patterns of instruction.

and all the constellations of information-gathering activities around it, are but a small speck on the broad social vision of foundations.

Table 2 estimates foundation support for education research using the annual reports of 28 foundations for the year 1989:

TABLE 2

Foundation Support of Education Research in 1989: A Look at 28 Foundations in the United States Based Upon their Annual Reports

	All Grants[1]	Education[2]	Research[3]
Bell South Foundation[4]	3,333,333	3,333,333	0
Bingham Foundation	1,202,860	508,360	24,000
Buhl Foundation	2,208,050	1,138,850	36,500
Bush Foundation	19,637,741	9,749,241	144,080
Carnegie Corporation of New York	39,984,558	14,535,240	3,176,600
Clark Foundation[5]	24,178,140	6,067,087	565,000
Danforth Foundation	4,424,353	3,273,045	13,000
Exxon Educational Foundation[6]	35,351,000	23,701,942	5,236,581
Ford Foundation[7]	164,500,000	28,928,095	334,000
Foundation for Child Development	1,992,81	446,311	144,237
Grant Foundation[8]	6,655,431	1,586,080	1,439,557
Hewlett Foundation[9]	39,544,508	13,078,500	1,933,000
Joyce Foundation[10]	12,273,454	3,461,331	367,780
Kellogg Foundation[11]	87,841,562	21,112,087	0
Lilly Endowment[12]	76,117,761	26,241,561	3,378,936
MacArthur Foundation[13]	151,703,000	6,917,459	3,472,632
Mailman Family Foundation	743,795	238,564	50,000
McDonnell Foundation	17,301,482	761,806	493,386
Andrew W. Mellon Foundation	71,736,535	36,907,150	2,112,000
Richard King Mellon Foundation	42,408,166	7,284,000	25,000
Metropolitan Life Foundation	10,485,773	2,020,210	0
Mott Foundation	38,268,173	3,823,565	180,000
Pew Charitable Trusts	146,650,300	34,619,500	4,137,500
Prudential Foundation	14,386,965	2,045,045	50,000
Rockefeller Brothers Fund[14]	6,421,100	550,000	0
Rockefeller Foundation[15]	54,914,031	7,681,532	544,832
Southwestern Bell Foundation	15,600,000	3,472,123	0
Spencer Foundation	8,895,122	8,895,122	8,895,122
TOTALS	1,096,966,474	272,377,139	36,753,743

Foundations are strongly committed to action and results; they are understandably skeptical of reflection disengaged from educational improvement. Increasingly, foundations and corporations have funded bold and large-scale demonstration projects that make no attempt to provide objective research-based determinations of success and failure. Where

NOTES FOR TABLE 2

1. Based on total grants made by the foundation as reported in the 1989 annual report. In some cases the foundations defined their fiscal years differently (e.g., on an academic rather than calendar year). The figures in the table reflect the year 1989 as defined by each foundation.
2. This column includes grants defined as education-related by each foundation in its annual report, if such a designation were given. In addition, some other education-related grants have been included in the total shown within this column when they appeared to involve education broadly defined—e.g., literacy programs, mentor programs, and museum-based education programs.
3. This column shows totals reflecting grants that have some substantial portion of their activity devoted to education research, not including program evaluation directed at the grant itself. The totals do include more than academic research—e.g., policy studies, surveys, research in collaboration with experimental changes in institutions, institutional support of research organizations, data-gathering and interpretation connected with action projects, etc.
4. The annual report is published over a two-year spread, so the figures have been divided equally to represent only one year.
5. The "Education" column includes one grant supporting retiree mentors for youthful offenders.
6. The figures for "Education" and "Research" do not include grants to recipients outside of the United States. Adult literacy programs are included in "Education" column.
7. These figures do not include grants to recipients outside the United States.
8. This foundation makes grants over two to five years and reports only the totals. The figures shown in the table for the year 1989 were arrived at by dividing each total grant amount by the number of years it covered. The same approach has been used for discretionary grants. Not included in education were drug and alcohol abuse or AIDS-related grants.
9. Using the Hewlett Foundation classification of Education; $9,725,500 represents higher education at large and includes discretionary funds.
10. Funds described as venture funds were counted as education but not as research.
11. $524,881 of the money allotted to adult education and museum education programs was included in education.
12. $1,000,000 for museum programs which were expressly for educational purposes was included in education.
13. Using the Foundation's categories for education and research.
14. These figures do not include grants to recipients outside of the United States.
15. These figures do not include grants to recipients outside of the United States.

"Several major champions of research have completely withdrawn their support for research in favor of a plethora of widely heralded but quickly forgotten 'action projects'."

research is supported, it is often for quick snap-shot evaluations of existing programs. Most disturbingly, several major champions of research have completely withdrawn their support for research in favor of a plethora of widely heralded but quickly forgotten "action projects."

In the funding world, whether philanthropic or governmental, R&D has come to stand for "replication and dissemination" rather than "research and development." As a result, no new ground is broken and millions of dollars are spent to no lasting result, building growing frustration among investigators, policy makers, practitioners, and the public. Society sees the appearance of problems being addressed, but there is no firm resolve or follow-through.

If a major corporation wishes to become more productive and maintain its leading role in volatile world markets, it does not curtail its spending on research and development. Even in hard times — especially then — it must invest in knowledge to improve production. Similarly, if we wish to create the schools, educational practices, and learning environments we will need in the future, we must not allow research support to dwindle as problems grow.

II. DATA AND FINDINGS

Mindful of these concerns about the future, the National Academy of Education, an honorary society of 75 distinguished researchers and educational leaders, launched a project in 1989 to explore emerging needs in the relationship between research and educational practice.

Funded by the Carnegie Corporation of New York, the Academy's Project on Funding Priorities for Educational Research did not attempt any exhaustive inventory of research within particular disciplines. Instead, it surveyed the whole realm of research on education in the hope of grasping overall needs and promising avenues of inquiry. Among the sources of information relevant to the project were responses to a letter sent by Lee S. Shulman, president of the Academy, to several groups of researchers and others interested in research on education. In his letter, Shulman posed the following questions:

"The Academy surveyed the whole realm of research on education in the hope of grasping overall needs and promising avenues of inquiry."

- What do you consider to be the most promising areas for research progress in fields where a substantial base of inquiry and evidence has been established, and where there is a likelihood of strongly positive influence on educational policy and practice? Please respond from the perspective of your research or policy specialties as well as from a broader perspective.
- What program priorities should guide support for education research and development over the next five to ten years, and what level of funding is needed to meet those priorities?
- How could the policies of existing national and state entities of research, development and dissemination be changed to improve education research and its application to policy and practice? What do you think can be learned from research efforts of the last two decades that might contribute in constructive ways to this process?

The intent in distributing these questions was to gather perspectives and views from people who think about research, so that the National Academy of Education might consider their orientation to research funding as it deliberates upon the question of emergent priorities for the 1990s.

The groups surveyed are identified on the next page in Table 3:

The responses arrived in the form of letters varying in length from 1 to 14 pages, often accompanied by documentary and other supporting materials that were filed for use as background material for the project. In a number of instances, the project made contact with

TABLE 3

Groups Surveyed for NAE Study
On Funding Priorities for Educational Research

Short Title	Category
AERA	Present and past leadership of the American Educational Research Association
CBASSE	Commission on Behavioral and Social Sciences and Education, National Academy of Sciences
City	Research Directors of City School Systems
Federal	Directors of Federal Labs and Centers for Educational Research
NAE	National Academy of Education
Other	Various other researchers and research administrators, including some connected with think tanks, policy action groups, associations, and teacher organizations.
State	Research Directors of State Departments of Education
Deans	Deans and Associate Deans for Research in schools and departments of education within universities doing substantial amounts of research on education.

those who responded, as well as with others with expertise in specific areas, to discuss particular issues relevant to the study. The letters went out during the summer of 1989, initially to members of the National Academy of Education, then to other groups through mid-autumn, and by late autumn all the responses were received.

"The contacts made by the project demonstrate the scope of the research community and the public and private agencies to which it is connected."

The contacts made by the project demonstrate the scope of the research community and the public and private agencies to which it is connected. The National Academy of Education itself represents major social and behavioral disciplines, such as psychology, sociology, anthropology, economics, history, philosophy, political science, and other fields connected to the study of education. The project also sought advice from the present and past leadership of the American Educational Research Association, including its divisions representing major groupings of education researchers. Also contacted for views on research needs and priorities was the Commission on Behavioral and Social Sciences and Education, National Academy of Sciences.

We solicited views from research directors of city school systems, state education personnel involved in research, directors of federal labs and centers for education research, and other scholars recommended by members of the National Academy of Education. In addition, the project communicated with legislative staff, policy makers, people in foundations,

federal and state administrators, deans of schools of education, associate deans for research and other research administrators in universities, representatives of teacher associations and teacher training institutions, journalists concerned with education, and leaders in key educational associations.

Besides surveying these groups, the project also convened focus groups to investigate particular topics. The scholars wrote issue papers and participated in intensive discussions of research needs. The aim of the meetings was to clarify directions that seem most promising for the research community in the years to come and to suggest how this vision might relate to the funding of research. The project and its steering committee engaged in several forms of synthesis to articulate the concerns represented in this report, ranging from commissioned papers to further discussions and the preparation of summary findings.

"The aim was to clarify directions that seem most promising for the research community in the years to come and to suggest how this vision might relate to the funding of research."

Building upon these sources of information, this report is addressed not only to researchers, but to all who are concerned about education. It intends to speak with special emphasis to public officials, research administrators and foundation representatives whose decisions shape funding priorities for education research. The final section of the report will elaborate upon a number of special opportunities for research to improve education.

WHO FUNDS EDUCATION RESEARCH?

When the study asked who funds education research, it was found that the largest and most concentrated share comes from the federal government, which supports evaluation, policy studies, program development, and fundamental research in areas related to education. Such support flows through the Department of Education, the National Science Foundation, the National Institutes of Health, the Department of Defense and particularly its Office of Naval Research, the National Institute for Mental Health, and other agencies.

Apart from program development and evaluation studies supported in relation to special areas such as education for the handicapped and vocational education, the appropriations for research and statistics in the U.S. Department of Education for 1991 were slightly less than $120 million.

States contribute to education research through expenditures designated explicitly for that purpose in agency budgets or attached to state-funded programs. The latter is most often earmarked for implementation and evaluation of mandates enacted in state law. In addition, state departments of education usually have a small office of research that supplies information for policy formulation and administrative decision making. Frequently this office is combined with a larger staff function dealing with testing and evaluation.

"Wide variation in structure, functions, and categories for tracking what is being done make it difficult to aggregate direct state expenditures for educational research."

TABLE 4

1991 Appropriations for Selected Research and Statistics Activities in the U.S. Department of Education

Program	Congressional Appropriations
Research Centers	$21,566,415
Regional Laboratories	21,312,681
Field-initiated Studies	975,900
OERI discretionary*	6,218,435
Statistics	40,537,000
Assessment	18,411,000
Education evaluation reform	2,928,000
Summit follow-up**	4,880,000

Source: Gerald E. Sroufe, "Uncertain Future for Education Research Despite Increased Congressional Support," *Educational Researcher* 20 (January-February 1991): 25.

* OERI is the Office of Educational Research and Improvement in the U.S. Department of Education.

** Summit follow-up refers to President Bush's Education Summit in Charlottesville with the nation's governors.

Wide variation in structure, functions, and categories for tracking what is being done make it difficult to aggregate direct state expenditures for education research. The state share of research funding is substantially larger but even more difficult to track with any precision if one adds the basic support given to state universities. Such support, which indirectly becomes a research subsidy in the form of sabbatical support and a portion of many regular faculty salaries earmarked for research, undoubtedly constitutes the largest single investment this nation makes in education research. But because it is so thoroughly mingled with teaching and administrative functions, the overall amount and its impact on research productivity remain unclear.

Another source of support comes from philanthropy, including foundation grants as well as corporate gifts. Though dispersed in their strategies, foundations are influential in supporting innovative research. But as we have seen in the NAE survey data, foundations only provide a minuscule portion of their education funding to research. There is concern in the

research community that numerous foundations are abandoning research in favor of demonstration projects with no research components whatsoever.

It is crucial that foundations concentrate their funding in ways that lead to educational change *and* in the research needed to reflect upon those projects. Educators, public policy specialists, and the research community must take pains to understand the changes under way, so that what works best can be communicated and adapted effectively.

The foundation community and the research community need to engage in much more active dialogue, for both sides have strategic leverage for generating new insights and building them into plans for change.

"Foundations must concentrate their funding in ways that lead to educational change and *in the research needed to reflect upon those projects."*

RESEARCH IN PRACTICE:
School Finance

During the past 20 years, leading social scientists have uncovered startling inequities in education funding that have led to the overhaul of state funding systems.

Researchers determined that age-old foundation programs and funding formulas, designed for an era when cities were wealthy in comparison with outlying communities, did not go far enough to offset differences between rich and poor districts. Studying the relationships between the amount of a district's taxable property, median family income, per-pupil expenditures, and state support to districts, researchers found that, under many existing mechanisms, the tax effort of poor districts to support schools was often twice as high as that of wealthier districts, which often received proportionately greater aid for their schools than poorer districts.

Researchers developed legal arguments to tell the courts that state systems of educational finance were unconstitutional because they denied students equal protection. They contended that quality of education varied on the basis of geography and poverty and that states should finance public education in a manner that does not favor wealthy communities, allowing them to provide a better education than other school districts could offer.

Between 1970 and 1983, more than half the states faced court challenges, which resulted in the forced overhaul of seven state systems and led to voluntary reforms by legislatures in several more states. The Education Commission of the States reports that, since 1990, there have been finance challenges in Alaska, Arkansas, Idaho, Kansas, Massachusetts, Michigan, Minnesota, Missouri, North Dakota, Oklahoma, Oregon, Rhode Island, and Tennessee.

Besides providing the evidence calling for overhauls of state systems, researchers have played a significant role in developing alternative proposals and court remedies, determining the effect of court-imposed solutions and examining other aspects of governance systems that control school funding.

One result of the finance reform movement is that today disparities among communities in taxable capacity, tax burden, and revenue are considered in funding formulas, which routinely take into account regional differences and variation in pupil populations.

The foundation world is not monolithic in its control, and it is not subject to policy directives from the public sector. The coherence and vision to make such changes in the structure of foundation funding must come, therefore, from within the community of philanthropy itself.

Beyond these major sources of funding, institutions of higher education, both public and private, provide funds for research from their operating budgets and from special endowments, in addition to the other sources mentioned so far. They offer internal grants, dissertation support, research assistantships, leave time for research, faculty travel funds, computers, other equipment or supplies, and seed money to start a project and generate outside support.

Universities also shape research priorities through decisions that flow from the tenure system, the disciplines recognized as departments and programs, subsidies for academic publications, and various institutional policies supporting interdisciplinary research as well as new specialties. When the internal structures of research universities are aligned with reform goals and substantive needs in public policy, they provide enormous reinforcement for addressing strategically important questions for solving social problems. But disciplinary structures and institutional authority can also insulate research from public discourse over educational aims and needs. The interplay is considerably more complex than is often realized.

"When the internal structures of research universities are aligned with reform goals and substantive needs in public policy, they provide enormous reinforcement for addressing strategically important questions for solving social problems."

Institutions of higher education are the sites where most research on education takes place. In discussions of funding priorities for research, it appears that less is known about research policy and planning at this level than in the more publicized and visible domains of governments and foundations. The project attended closely to the internal structure of research funding within institutions, looking not only at the utilization of grants received from government agencies, foundations and other external sources, but at the support probably always present in faculty time allocated to research and various forms of ongoing institutional assistance.

We say probably because the actual amounts of such support are well nigh impossible to calculate in view of the variety of institutions, the array of funding arrangements, and the empirical problem of measuring exactly how such resources are being used. Clearly, though, it is appropriate to ask how institutions structure their incentives internally for launching research programs. Any effort to address substantive goals in research must influence such internal structures. A major boost in research support should have an impact on the infrastructure as well as making funds available for specific substantive goals.

To find out more about this aspect of research funding, the project sent letters to seventy deans or associate deans of research at schools of education in the United States. The

institutions surveyed were universities, both public and private, engaged in education research. The survey pursued the following rationale:

> In conducting our inquiry on funding priorities for research, we have realized that new ideas and new combinations of researchers often emerge from institutionally financed research. This happens through such things as revolving or competitive research funds managed within institutions, often from the operating budget or a special fund. Another pattern, less visible to the outsider, is the provision of research assistance and other forms of direct and indirect support for research. Another variant, particularly where computer applications are involved, might be cooperative arrangements with local corporations, involving the use of equipment, access to new technology, and shared expertise for conducting research. Some scholars, moreover, get access to grants and requests available through independent research centers outside the departmental structure on campus. And there are also such hidden subsidies as course relief and leave arrangements, not to mention provisions of computer time. These are some of the many forms of internal support that do not appear in reports on research funding in education. They add up to the substantial base for continued productivity in research enterprise.

Requesting that our survey respondents give some thought to these and similar types of funding within their institutions, we asked a series of questions designed to find out how institutions create internal priorities and supports for research activity. The larger strategy in pursuing this line of question was to learn whether there might be ways of making better connections between urgent needs for educational improvement in our society and the existing capacities of disciplined inquiry as organized in American institutions of higher education.

The magnitude of institutional funding differs widely from one institution to another—from $45,000 to $5 million among the institutions we surveyed. In addition to the difference in the fiscal size and research capacity among the institutions, the variation in institutional support for research also appears to come from differences in the ways in which institutions report and categorize their support.

"Internal grants for research are an important tool for helping faculty members do the spadework leading to external funding."

Internal Grants for Research

The most widely adopted types of research grants within the responding institutions were seed money for research initiatives, assistance in publishing materials, and travel grants. The unit amount of the award varied from $200 to around $5,000, but regardless of the magnitude, such grants appear to be an important tool for helping faculty members do the spadework leading to external funding.

Since the survey questions were not designed to gather longitudinal information, we cannot interpret long-term developments in the patterns of institutional funding coming from

"Incentives for research initiatives or pilot research must become more important as a funding priority for education research if we wish to support the capacity of institutions to generate new ideas."

within postsecondary education. However, one annual report we received from the graduate school of education in a major state university gave a clue for future directions when it suggested there will be decreasing resources provided by the university to facilitate efforts to secure external funding, which means that the faculty must become more independent in this endeavor.

If such is the case in other institutions, then incentives for research initiatives or pilot research, apart from substantive goals, will become more important as a funding priority for education research if we wish to support the capacity of institutions to generate new ideas. The importance of such developmental funding is recognized by programs specifically designed for grant scouting, covering travel, telephone, and other activity leading to the development and funding of research projects.

Several institutions reported that they earmark a certain amount of dollars to support the junior faculty. For example, one state university responding to the survey allocates a fixed portion of indirect cost recovery funds from grants to support new research initiatives. Other institutions distribute such funds to the principal investigators of the grants, or disperse it in equal shares throughout departments.

With the same goal in mind but limited to an incentive strategy, another institution has what it calls creative match grants, funded with dollars collected by the institution for overhead. In some cases, to make grant proposals more competitive, a university will permit faculty to use a lower overhead rather than the established amount, thus offering a direct inducement to stimulate new work.

Wherever sources are available internally, such as the income from research endowments, alumni giving, and funds acquired through other donors, the institutions surveyed offer university-sponsored research grants on a competitive proposal basis. The most visible form of these grants is the summer fellowship, which usually includes travel grants, stipends, and summer salaries to replace summer teaching opportunities with research activity.

Graduate research support is also an integral component of the direct support for research by the institutions surveyed. The most common academic enhancement programs take the form of doctoral dissertation awards and graduate internships. One university surveyed includes a small rebate for all doctoral students hired on extramural contracts.

As part of the institutional effort to stimulate research, a couple of institutions that would not be considered premier centers of education research have explicit and unusually detailed faculty reward systems that recognize outstanding achievement in research through promotion and in some cases merit pay. The aim seems to be to provide structured incentives, more visible and concrete than the normal tenure process, for increasing the institutions' research productivity.

Faculty Time

Less visible but perhaps most important in terms of giving the faculty members time to pursue their research work are the various provisions for released time, given either independently or in combination with other forms of support. University-sponsored research leaves are visible and direct research support, while work-load policies allowing faculty additional time devoted to research often provide hidden subsidies.

Sabbaticals are the most conventional way to allow the faculty members to devote an uninterrupted time to research. Most institutions give options for research leave and sabbatical as either one semester with full pay or an entire academic year with half pay. The direct subsidy for education research given in this form is larger than any other source of research funding for the field of education in the United States.

"The direct subsidy for education research given through released time is larger than any other source of research funding for the field of education in the U.S."

The largest proportion of internal funding for research within institutions of higher education comes under the category of faculty time. Those respondents who indicated the basis of estimation assumed that about 25-50 percent of faculty time is assigned to research. One university included the cost for faculty time assigned to advising on doctoral dissertations as an indirect research support. A few respondents mentioned a provision in their released time policy that specifically assists newly hired junior faculty members during their first years in engaging in research.

Infrastructure

Along with the provision of faculty time, what might be called research infrastructure is an indispensable mechanism for faculty to continue their research. Major components of infrastructural support include:

- Services provided by the Research and Development Office, or an administrative division of the similar function, that range from consultation to writing grants to clerical and administrative assistance.
- The costs for purchase and use of computer and research-related equipment as well as limitless computer time and technological support.
- Graduate assistantships for research.
- Supplementary resources allocated to research centers, including research associates, data analysts, clerical and administrative staff.

"Bolstering the research infrastructure — including graduate assistantships, support for technology, and supplementary resources for support and research staff — is indispensable for supporting faculty research."

We found in our survey that the discretionary funds of the dean's office or department chair are used in various ways to support research activities, such as conferences and institutes

with faculty presentations, or to cover photocopying, telephone, postage, and other miscellaneous items required for research as well as faculty travel and research assistants. These funds are in most of the cases negotiated by the faculty member with the dean or associate dean and may include general overhead such as space, utilities, and maintenance in the indirect infrastructural support for research, though the latter applies to teaching and other duties as well.

One state university provided figures on funding broken down by the major types of education research conducted in the university. If similar information could be acquired from other institutions, it would be possible to discern the current patterns of internal research funding priorities.

Decision Procedures

To award internal grants on a competitive basis, many universities use "peer review" at either a school-wide or college-wide level as part of the decision procedure to evaluate proposals. A typical procedure takes the form of a committee that provides the dean, department head or higher administrator with recommendations regarding resource allocations. As an example, one private university has a research committee composed of five faculty members with an associate dean as ex-officio member. The committee's function is to foster quality research, review faculty research proposals, and assist with dissemination of faculty research results.

Decisions are based on the merit and quality of the submitted proposals, the extent to which they complement the university and school mission, and the promise for continued external funding. Such considerations are important to keep in mind when looking at the broader patterns of funding sketched earlier, since external funding, no matter how large, flows into institutions which conduct research according to their own tacit rules and incentives.

A state university with an unusually well defined mission in education research lists the following as common reasons for awarding a research assistant: assisting faculty doing work likely to lead to external funding, consistency with central college or department missions, providing support to faculty who have been asked to take on major responsibilities important to the college or department, retaining faculty being recruited by other institutions, and providing research experience for graduate students.

Faculty research time, other than what is achieved on a competitive basis, is negotiated by faculty members with their department chair. The quality of the proposed research, the quality of the faculty member's past research, the contributions of the work to the college or department, and the faculty member's other responsibilities are the conventional bases for approval. One way public policy can make better use of research is to devise funding strategies

more closely attuned to the workplace conditions of those called upon to conduct research for the improvement of education.

Table 5 summarizes internal forms of support for education research within institutions of higher education in the U.S.:

TABLE 5

Types of Research Support Within Institutions of Higher Education in the United States*

1. Direct Research Support
Budgeted Departmental Funding
Internally Supported Research Center
Endowment Income Set-aside for Research
Internal Grants Outside of Budget
Waived Overhead for External Grants
Grants from Alumni Giving
Gifts for Research from Donors
Summer Fellowships
Institutional Research Fellowships
Faculty Development Funds
Internal Travel Grants
Seed Money for Research Initiatives
Faculty Reward System/Merit Pay
Graduate Assistantships/Research Support
2. Indirect Support — Faculty Time
Research Leave
Percentage of Faculty Time Assigned Research
Released Time and Course Relief
Sabbaticals
Faculty Time for Advising Dissertations
3. Indirect Support — Research Infrastructure
Research Overhead Account
Computer Time
Equipment, Supplies and Services
Technical Support
Grant Writing and Administration
Secretarial and Clerical Assistance
Research Center Support
Discretionary Funds for Conferences
Space, Utilities, Maintenance

Note: In some cases these categories can incorporate external grants from governmental, philanthropic or corporate sources — e.g., when a research grant is used to offset a course or pay for a sabbatical year — but this table and the survey on what it is based was designed to capture subsidies from within institutions. Often external and internal forms of support are so intermingled that it becomes difficult to distinguish internal from external support.

"Patterns of support for education research are episodic, buffeted by changing demands, vacillating leadership, unstable commitments, and institutional pressures."

PROBLEMS IN THE ORGANIZATION OF RESEARCH

Despite this array of support for research on education—ranging from federal, state, and foundation funding to the intricacies of research decision-making within institutions of higher education—the study found serious problems in the organization and funding of research. The solution is not only to increase the funding of the research enterprise, but to improve its organization so that it becomes more effective in addressing human needs. In the project's surveys, focus groups and other communications, as well as in the deliberations within the National Academy of Education itself, several leading concerns emerged:

- Research on education lacks comprehensive, effective strategies to shape funding. As a nation, we have had little trouble agreeing on the need to cure cancer or to stop smoking and to conduct research in support of those goals. Today a powerful consensus is needed on something equally important to our future: a strategy of research and development to improve education.
- Patterns of support for research on education are episodic, buffeted by changing demands, vacillating leadership, unstable commitments, and institutional pressures.
- Studies tend to be small-scale, short-term, not interconnected, and rarely longitudinal.
- Neither the federal nor the state governments fund leading centers of research at sufficient scale of operations or levels of funding to maintain their momentum as centers of excellence over periods of time long enough to communicate effectively with educational practitioners.
- Most of the public funding that is available specifically for education research goes into designated studies and research centers regulated more or less overtly by current but rapidly changing political and policy considerations, depending on who has political control of the research dollars.
- Too little room is left for coordinating field-initiated ideas, for theory-building and conceptual work to shape new inquiries, and for the cumulative insights of long-term empirical investigations.

Much more could be said about the organization of funding and its impact on research. A separate study along those lines for the federal level has been launched by the National Academy of Sciences in recent months. We expect that it will engage these issues at greater depth than is possible here. Suffice it to say that the current fragmentation of research funding is inimical to the vision of the future we have been sketching, for it signals an incapacity to move ahead with any serious agenda at all over a sustained period of time.

Given the absence of a clear strategy in the organization of research funding, the results should not be surprising:

- Education research as a whole is fragmented and theoretically diffuse, marked by a profusion of studies too often leading down divergent paths to endlessly debated viewpoints and assertions.
- The whole enterprise is slow in responding to powerful new currents of fundamental research in disciplines touching upon the study of education.
- Most research on education is not funded at levels sufficient to allow intensive experimentation and collaboration with educational practitioners.

"Research on education is marked by a profusion of studies too often leading down divergent paths to endlessly debated viewpoints and assertions."

RESEARCH IN PRACTICE:
Educating Students with Disabilities

Education research has had a profound influence on how we educate students with disabilities. New studies on mainstreaming difficult-to-teach students, for example, have led to better diagnosis of learning problems, improved instructional practice, and streamlined programs. The changes have prevented misclassification of students, particularly minority students, in special education programs.

As a result of developments in metacognition, cognitive strategies, direct instruction and behavioral interventions, peer counseling, cooperative learning, and reciprocal teaching, educators have dozens of strategies to intervene in learning problems earlier and with greater success than ever before without resorting to elaborate testing or expensive consultations.

Federal officials say the research on prereferral intervention strategies alone has led to 25 to 50 percent reduction in requests for full evaluations to special education. It has also spurred a stream of outreach activities in 27 states, which have been leveraging federal dollars to launch prereferral programs at the local level.

Observers note that special education may be a model for research dissemination. Special education research, with strong political support in Congress, is closely connected to overall special education priorities. Research is not an ivory tower activity; it is seen by educators and policy makers as part of implementation. In addition, teacher training is linked to research and housed within schools of education — the area of academe that most values the professional development of teachers.

The federal government, through the Division of Innovation and Development in the Office of Special Education (DID), recognizes the importance of providing researchers with opportunities and tools for transforming research findings into useable information for practitioners and policy makers. There is an emphasis on field-based researcher, and a free-market atmosphere, in which a wide array of competing new ideas are funded.

Moreover, much of the research is funded through coordinated strategies. For example, in 1985 the DID launched a five-year research program to systematically investigate instructional, organizational issues related to educating children with disabilities in the general classroom environment. This approach, with funding tied to areas most likely to yield results, is an example of the type of consensus building and priority setting the National Academy of Education says is needed for research for all education programs.

- The paucity of longitudinal studies has resulted in an over-abundance of "snapshots," studies of specific treatments and interventions without a systematic and cumulative knowledge base established over time and under varying circumstances.
- Not enough of the available knowledge is interconnected and mutually informing; it is too rarely placed in perspective to discern patterns between levels and across parts of the entire educational system.
- Institutional research does not adequately take into account outside forces impinging on the educational settings under study, such as the social, cultural and economic forces influencing dropouts, testing, tracking, school discipline, reading habits. etc.

Nonetheless, superb work is being done on a number of fronts. How can we build on what is excellent to resolve issues of quality and relevance in education research generally?

The answer is not further neglect of the enterprise, but a greater commitment to achieving its potential. Research at its best is already useful in this society's quest for educational improvement, but it can become even more so when supported with greater political will, organizational acumen, and strategic funding.

"Institutional research does not adequately take into account outside forces impinging on the educational settings under study, such as the social, cultural and economic forces influencing dropouts, testing, tracking, school discipline, and reading habits."

As a society, we must take greater pains to organize ourselves for achieving goals in education. There is a great deal we need to know to do this well on the scale required. The social costs of acting without understanding will be far greater than the costs of supporting a fully activated research community in partnership with the worlds of educational policy and practice.

Governments, foundations, corporations and institutions of higher education should increase their funding of education research so that it is more appropriately scaled to the magnitude of the problems we face in school systems and other educational institutions. First we must make strategic decisions that none of these funding sources alone can control, deciding how to organize—conceptually as well as institutionally—an enlarged base of research funding so that it will be well invested. To accomplish such an aim, this nation must create better structures of consensus-building and quality control as a basis for new advances in research, while also increasing levels of funding for that purpose. Only in this way can we build a greater commitment to thoughtfulness at the heart of public policy for improving American education.

"We must create better structures of consensus-building and quality control as a basis for new advances in research, while also increasing levels of funding for that purpose."

III. CROSS-CUTTING THEMES

By asking hard questions and imposing rigorous standards of inquiry, good research intensifies the quest for what works in American education. But it also does more than that. Research clarifies educational aims, needs, and outcomes.

The research community works in the public interest by continually bringing verifiable evidence and new information about educational issues to policy deliberations. Insistently, research cautions us to grant only conditional approval to answers we might find along the way toward institutional reform, subject to further investigation from competing viewpoints.

"Research cautions us to grant only conditional approval to answers we might find along the way toward institutional reform, subject to further investigation from competing viewpoints."

Diverse as it is, the research community bears a singular responsibility for enlarging the possibility of human learning—and along with it the quality of human life. In the surveys and discussions sponsored by this project, many perspectives emerged to show how seriously researchers take such responsibility.

We have chosen four themes to characterize what the research community has to offer for sustained educational improvement in the coming years.

1 Researchers are responsible not only for studying what is, but for illuminating what could be. To the maximum extent possible, education research should be organized to open new pathways toward educational goals. As in medical research, what we need today is not yesterday's leeches, but the cures of tomorrow.

The research enterprise should be positioned to do much more than report on the effectiveness of programs. Important as that may be, evaluation by itself is not enough to bring the educational improvements this society is seeking.

"Research should illuminate, to the greatest degree possible, what could be *along with what* is."

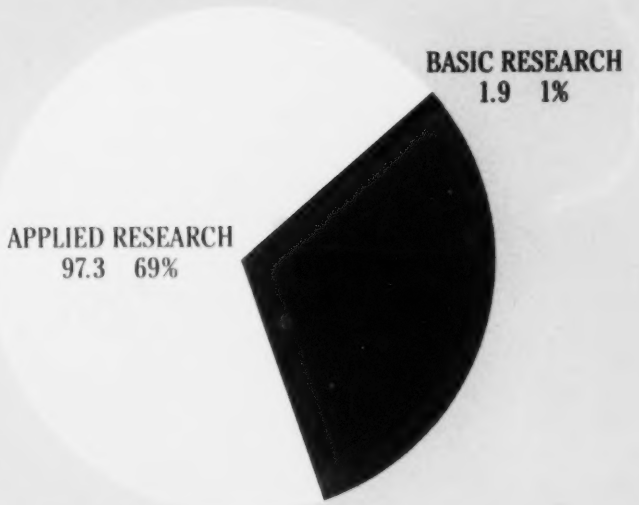
Research should illuminate, to the greatest degree possible, what *could be* along with what *is*. As in industrial research, the aim is not just quality control of what has been produced in the past; it is to generate new ideas on how to accomplish the task better in the future. Sometimes this means making something different for the future.

Education research can help to anticipate problems and discover the best means of teaching and learning, but it needs support in this direction, and it needs to be organized in such a way that makes it possible to address such goals.

Today, only a small minority of the funding that goes from the U.S. Department of Education into research under its various programs is used for the creation of new knowledge.

FIGURE 2

Types of Research Support in the U.S. Department of Education During Fiscal Year 1987
(in millions of dollars)



Source: Arthur D. Sheekey, "Research Support for Educational R & D," Education Information Resources Division, Office of the Assistant Secretary for Educational Research and Improvement, U.S. Department of Education, 1988, Chart 9.

The point is not that programmatic research lacks merit. Such inquiry is extremely important; it must be supported with all the political will and financial resources available. Yet the task of educational improvement, broadly defined, also needs to be supported for reasons not necessarily connected to specific federal program requirements. Basic knowledge and greater institutional know-how on a wide scale are needed to meet the educational goals we set for ourselves as a society. We are suggesting not only that federal funding should be increased for research, but that research should be engaged more productively as a leading force in defining the federal influence in American education.

"Research should be engaged more productively as a leading force in defining the federal influence in American education."

States also fund educational inquiries of various kinds, mostly to manage assessment and data-gathering, monitor the efficiency of educational systems, and support implementation of program goals for education across the state. The state role in educational governance and its proportion of funding has grown nationwide, and the potential for research support has grown apace. Despite budget problems in a time of fiscal crisis, states are engaged more directly than in the past in supporting studies of effective schools, administrative practices, minority cultures and schooling needs, dropout prevention programs, new assessment programs, curriculum concepts and development, and innovations in teacher training and professional development.

The coming decade will provide many opportunities for deeper collaboration between the research community and state government for the improvement of education. But it will be necessary, as at the federal level, to recognize the distinctive role the research community can play, instead of merely expecting from it a functional role within the boundaries of the state programs. Research must unsettle. Often the best research challenges institutional arrangements that do not adequately advance the cause of learning. Critical perspectives, along with the other contributions of research, go hand in hand with the state's constitutional responsibility to meet the growing educational needs of its citizens.

Foundations and corporate support are an important stream of funding for education research. Some established foundations have earned a reputation for support of education research over the years, but many new players are on the scene, introducing not only new funding but distinct attitudes toward the use of funding that often differ from the operating assumptions of the older foundations. If this project emerged with any single message for the variety of foundations that take an interest in education research, it is that research support should be adventurous and far-sighted, and sustaining for a period long enough to show results. It should not be concentrated only in grants exhibiting a short-term project mentality.

"Often the best research challenges institutional arrangements that do not adequately advance the cause of learning."

What research can contribute, and what is much needed today for the improvement of education, is a discerning and critical attitude that is at the same time constructive and experimental. This is exactly what foundations have to offer—and what they can best support. The research community has this to offer: To grow and prosper as a learning society, we set up hypotheses and test them in the real world, and we do so to discover what works best for the creation of true learning, while also raising more and better questions about education as we proceed. To advance along these lines we need to take risks, make mistakes, try out new things. In some cases we will have to suspend judgment until we have enough information to know what we have accomplished.

"We need to take risks, make mistakes, try out new things. In some cases we will have to suspend judgment until we have enough information to know what we have accomplished."

Foundations, which have greater flexibility than government agencies, can continue to play a special role in maintaining this aspect of American democratic practice. Even more can be done to integrate research and reflection in the action projects favored by foundations. That process of integration should mean not only seeking conventional measures of program effectiveness, but pushing for more discerning languages of change so that we can go the extra mile to achieve our goals. Creative foundations can help to stimulate the best kinds of imaginative inquiry the research community has to offer.

Finally, universities and other institutions of higher education have a long-standing responsibility to advance the cause of research in improving education. Not only do they seek to preserve the values of good research; they also provide direct assistance to the research community.

In the project's survey of schools of education and other university-based sites for education research, we found a great variety of configurations for supporting research. Universities, as we have seen in reviewing the project's findings, help to subsidize the research activities of their faculty, and they pool funds for incentive grants, fellowships, summer stipends, travel allowances, and awards for special projects.

A few universities take special pains to publicize the research activities and findings of their faculty, thus helping researchers to reach a wider audience beyond their own disciplines. Some foundations—Spencer Foundation is the leading example with its fellowship program—support young scholars with nationally recognized programs. Besides having a marked influence on the development of fresh research topics, this practice has launched bright newcomers into careers as researchers interested in education.

"For the most part, the novice researcher must eke out a tiny niche of unassailable legitimacy in some narrow field of expertise."

Nevertheless, the institutional structure of research as it is encountered by young scholars does not encourage a large view of the educational prospect. For the most part, the novice researcher must eke out a tiny niche of unassailable legitimacy in some narrow field of expertise. Once having earned a place in the academic community, many researchers hear only distant echoes from the worlds of educational policy and practice.

One goal for institutions, consistent with the future we have intimated in this report, would be to engage research more deeply in the problems of educational practice, both within and beyond schooling institutions and including higher education itself. From our survey it is apparent that many leaders in universities are interested in forwarding such an agenda and are sensitive to the pitfalls. They see the possibility of connecting research more creatively with educational practice without sacrificing the legitimacy of the disciplines. Much more attention is needed and higher levels of funding will be required to bring these glimmers into full view and to take stock of the potential for change.

2 People learn everywhere, not just in schools. Education research needs to embrace context, whole configurations of learning that take form within families, communities, cultures, workplaces, and other areas.

The solutions to educational problems are not always found in existing institutions. Much as we have invested in current facilities, it would be a mistake if this nation's dedication to educational improvement became confined to the structures we have already built. It might well turn out, in some instances, that the interests of students, institutions and society as a whole would be better served by discovering more productive forms of learning engagement, whether or not they are to take place within existing structures. This will mean using research to imagine the future, as we have argued, but it will also mean that we look at past and present realities of education in a fresh light.

"The interests of students, institutions and society as a whole may be better served by discovering more productive forms of engagement with learning."

Along with helping to improve school effectiveness and student performance, research can explore educational processes in the most fundamental way. Learning is not only a function of schools; it is connected with families, communities, non-school institutions such as museums and media, the organization of workplaces, and social processes throughout people's lives.

Students spend a small part of their waking lives in school. Research can draw attention to the role of the other institutions and agencies that help shape learning behavior and transmit ideas and culture to young people. How can the experiences young people gain in the outside world be more productively connected to schools, and how can we as a society improve the quality of experiences outside of school to promote academic success, whether or not they are more closely connected to learning in the classroom?

Imaginative research on families, for example, illuminates their educational roles and can help to make them more effective as educational institutions. Looking beyond schools as well as within them, this perspective explodes many of today's prevailing conceptions of educational reform. Those conceptions spring from a hidden premise that if schools are fixed, they will fix the problems of schoolchildren, no matter what happens in their families and communities. We need more research on non-school educating institutions and their social contexts to correct this faulty perspective. The recently instituted federal research center on families, schools, communities, and children's learning is a step in the right direction, but larger-scale efforts are needed.

A high priority for understanding education from such a broader perspective is the development of conceptions of learning that embrace the whole life cycle of human beings. We need such enlarged conceptions to guide policies that are likely to influence lifelong learning in the future.

In particular, there should be more resources devoted to research on the factors in the work situation and family situation that influence what adults learn in these settings. Studies on performance in the workplace should pay attention to the relationships between job demands, the kinds of expertise required, and the outcomes of schooling. The mathematical, scientific, technological, and verbal literacy basic to the performance of technical skills should be studied and specified in the course of research on such flexible learning ability as will be required in the society of the future.

Given the separation that now exists between in-school and out-of-school learning, more inquiry is needed how to orchestrate the healthy growth of human minds amidst the shifting cognitive, perceptual, and imaginative activities required by advancing technologies, by participation in community life, by the kinds of service and cooperation in which more and more people will be involved in our future society. To accomplish such goals, we need to widen our conceptions of the educational process, imagining education as an interconnected web composed of school, family and community, workplace and political processes, media and information systems of all kinds. When viewed from this perspective, research is clearly in need of a greater commitment by funding agencies to broad-based, collaborative, and interdisciplinary inquiry.

"We need to widen our conceptions of the educational process, imagining education as an interconnected web composed of school, family and community, workplace and political processes, media and information systems of all kinds."

Another high priority for research is the neglected role of community involvement in educational processes, especially for young people considered to be at risk of educational failure in school systems. We need better contextual information on the economic, political, and social conditions that influence educational opportunities at all levels of schooling and beyond.

When thinking about schools in relation to the environments and educative influences around them, we need to look more closely at the social context of instruction to understand how different students and teachers make sense of it. Do schools convey implicit assumptions about the purpose of learning tasks? Are there tacit values attached to certain kinds of literacy? Do the unspoken norms of classroom activities distribute learning resources and incentives to different kinds of students in ways not intended by policies governing schools?

Historical and philosophical studies can help us to discern the broader outlines of our educational enterprise, the values we espouse and those we call forth in the forms of education we have created. Such studies deepen our vision of what we are doing, and they help to clarify what remains to be done when we perceive areas of great value to our future that now lie beyond the reach of our institutional capacity but within the bounds of the possible. Research of this kind sheds light on prevailing arrangements and policy alternatives, sharpening our perceptions so that we proceed with a clear sense of what our institutions are accomplishing, what they could be, and what they should be.

3 Educational problems cannot be solved by developing treatments that focus on one level of the system or one aspect of the process under way in learning institutions. Research should help to discover the connections between policy, organization, instructional practice, and learning.

More funds are needed to stimulate good research in American education, but more funding will provide no panacea. Research itself needs to be organized more effectively for sustained impact on educational policy and practice.

Part of the problem is that studies and their dissemination often focus narrowly on certain layers or sectors of a highly interactive system. They engage only one level of governance, for example, or they delve into one type of classroom intervention without looking at the overall context and process of classroom life. Numerous examples came to the fore in our surveys and conversations to illustrate this point. The upshot is that there needs to be more interconnectedness among research studies, both at the theoretical level and in the practical study of learning situations and institutions.

As an example, the current dialogue about restructuring and reform of elementary and secondary education will not be advanced by a kaleidoscopic array of disconnected studies and evaluations. We need to develop clear conceptions of what the improved school will look like to students and teachers, and what they and their communities can do together to sustain such institutions. Research can be of assistance in this endeavor, but not without more interplay among research studies, greater communication and feedback between researchers and those involved in educational practice, and a heightened sense of the relations between specific research questions and the overall life of learning institutions.

Results from our surveys and discussions also reveal the need for better perspective on the continuities of human lives and their learning over time. Research should not single out one grade level, learning problem or institutional phase to characterize the educational needs of human beings and their communities. People learn all through their lifetimes, and in many respects the learning continuum is connected throughout. Likewise, the roles of different learning institutions are complementary and must be treated as interacting and mutually reinforcing if research is to illuminate the process of learning.

Such an enlarged perspective is especially important when connecting fundamental research with directed policy change. Quite often in the past, policy makers have turned to specific research findings, often based on narrow and transitory interventions, to provide dramatic leverage for making momentous policy changes in the nation's educational systems. But for research to be truly useful in framing policy, its findings must be connected, reconciled,

"Quite often in the past, policy makers have turned to specific research findings, often based on narrow and transitory interventions, in making momentous policy changes in education."

and generalized in ways that can speak comprehensively to the social needs being addressed by public policy.

"Studies need to be framed in ways that take into account the multiple and intersecting forms of social action and authority."

The research community bears the responsibility of developing its powers of generalization and integration, both theoretically and empirically, so as to be able to speak coherently to policy. But at the same time, capacities must be developed in the policy world to listen, to take counsel from well conceived programs of social research, and to learn how to use research findings of this more comprehensive sort when they are available.

Overall, there needs to be much more cross-fertilization of ideas and findings between researchers, policy-makers, and educational practitioners of all sorts. For researchers in particular, studies need to be framed in ways that take into account the multiple and intersecting forms of social action and authority that constitute education as a process in American society. Studies that illuminate context along with specific problems will be most likely to stimulate future improvements in American education.

Funders can help in moving research toward greater effectiveness in relation to educational practice by becoming more mindful of such connections in research domains. They can also help by supporting longer-range studies that are able to combine research questions in ways that focus on specific problems while also engaging the surrounding and interacting context of educational change.

"It would not be wise to increase funding without attending to the structures needed to ensure quality and to cultivate the long-term social benefits of research."

4 Increased funding for education must be accompanied by greater efforts to ensure quality in education research.

We believe that an enlarged base of public and philanthropic funding for research is indispensable to the improvement of education in the U.S. But it would not be wise to increase funding without attending to the structures needed to ensure quality and to cultivate the long-term social benefits of research.

Issues of quality cannot be controlled solely by the research community, nor by funders of research, nor by policy makers representing the public. It must be a collaborative endeavor, involving collective oversight and a deliberate strategy in which all partners can give their assent with respect to fairness and reliability.

The Academy believes the major funders of research, both governmental and philanthropic, should consider the matter of quality assurance a high priority for developing new research policies in the coming years, along with an expansion of research funding itself. We suggest that the recently constituted committee on federal research funding under the National Academy of Sciences carefully investigate the issue and make comprehensive proposals extending the reasoning of our initial reading of the possibilities.

In addition, we suggest that, as an outgrowth of this study, the National Academy of Education examine the establishment of a National Panel of Reviewers. The panel would work with practioners and researchers to advise the federal R&D effort, proposing consensus on what is known and recommending new studies to close gaps in the research base.

The panel would deliberate on the meaning of existing research findings. It would seek areas of agreement in interpretation, identify which contexts and conditions affect possible implementation of research findings, and discuss what further work needs to be done to advance the state of knowledge in the field. The panel would propose guidelines for practice as well as for the direction of new research.

RESEARCH IN PRACTICE:
Writing

Research on composition, like research on reading, indicates that effective writing instruction is less a matter of teaching rules and structures—composition, rhetoric, or grammar—as it is helping students create meaning.

As one article notes, research has taught educators to teach writing as an active process—as a verb instead of as a noun. Researchers have discovered that the best gains in writing are made when teachers help students learn the process of prewriting (planning), writing, and rewriting.

Encouraged by the research, educators have explored new teaching strategies and have increasingly used journals, folklore, and peer collaboration in teaching. Researchers have drawn attention to writing as a tool for learning, helping teachers understand more about how writing helps students learn history, science, and other disciplines as well as English. This has led to new types of assignments that encourage students to use writing to explore and reflect on academic subject matter.

Promising research is now being conducted on the kind of writing approaches that are successful with students from different racial, ethnic, and linguistic backgrounds.

Unlike other areas of research, improvements in writing instruction grew out of teacher-centered groups that included partnerships between researchers and teachers in grades K-12. The development of new forms of writing instruction pioneered in schools has moved upwards to have significant influence in writing instruction in the nation's colleges and universities.

We must stop innovating out of expedience, ignoring our obligation to study the consequences of our efforts and to understand the dynamics of the programs we introduce....With properly funded and conducted programs of education research, American education can finally come to its senses.

Lee Shulman, Stanford University
President, National Academy of Education
from the *Afterword*

IV. SPECIAL OPPORTUNITIES

In this section, we present five special opportunities—particular areas in which the research community is positioned to make a profound and lasting contribution to constructive educational change.

First, one of the great challenges facing American education today is to cultivate active learning in all citizens. Such learning, distributed throughout the population and across the life span, is absolutely necessary for the kind of society we wish to be in the future—productive, innovative, dynamic, growing. Research must be organized to help understand, create, and sustain the type of teaching and learning that will encourage students to take initiative, solve challenging problems, construct meaning for themselves, and develop thinking skills in new and unfamiliar settings.

Even with reform, we cannot be sure our education system will produce the dynamic learning needed to sustain our society in the future. To create powerful forms of teaching and learning that will foster reasoning in young people, we need to know more about the nature of proficient thinking in school as well as in life and work beyond school. We also need more research on everyday reasoning, which among other things will make it possible to experiment in the classroom environment with learning strategies gleaned from studies outside of school.

If changes are to occur, we will need more studies that can help teachers and teacher educators understand more about cognitive development. We will need studies of instructional interventions, both in teacher preparation and in schooling, that draw from the best new research on the acquisition of knowledge. Developing a better understanding of how children think and how to make contact with those ways of thinking can be a major factor in improving student attainment, ensuring that school and teaching do not turn off habits of thinking.

"Developing a better understanding of how children think and how to make contact with those ways of thinking can be a major factor in improving student attainment."

Researchers can help teachers understand educational environments that encourage thinking and exploring so that students can be intellectually engaged to solve challenging problems as individuals and as a group—the kind of learning students will use in the real world.

In addition, it is important to develop inquiries designed to help children think systematically and interactively about the questions proposed by teachers, according to a set of agreed-upon goals and using forms of assessment that support effective instruction.

Research can address some of the knottiest problems that arise in designing effective instruction: how do the levels of knowing change in the course of the curriculum, and what can

teachers do to support the advancement of understanding? How should the issues of depth versus breadth of coverage be resolved in developing new curricula? Because investigations in this area are aimed at teaching as well as learning, many of them should be conducted in collaboration with teachers to produce maximum benefit for educational practice.

"An imaginative research community can advance the larger vision of how education might change to support what we want to be as a society."

In general, such research asks, how can we focus instruction effectively on the development of competence? We need studies that elucidate the particular forms of teaching and learning characteristic of each school subject. A parallel need is for inquiries into the assessment of performance in those domains, building upon conventional methods of testing, but working toward more effective means of discerning competence as students learn. This development in turn will require the specification of clearer standards of performance for use in testing situations that can accommodate a rich view of human development.

All these prospects suggest the scope of what needs to be done to advance a research agenda capable of stimulating improvements in American education. Such an agenda embraces schools but also looks beyond them as well as more deeply within them. It demonstrates that an imaginative research community can advance the larger vision of how education might change to support what we want to be as a society.

Such studies—across many fields—are needed to build institutions that can discern competence. They provide a way of seeing how to engage students in complex forms of shared thinking as well as individual challenges. Some of the areas that emerged as salient in relation to educational practice were new work on language and literacy, on comparative education as a way of understanding other cultures and educational alternatives, and on possibilities for supporting thoughtfulness in the work and workplaces of teachers.

A common element emerging from many of the areas can be summarized with the following perspective: A larger commitment to research for educational improvement should make it possible to engage in well formulated studies connected to experimental changes in institutions. Such engagement of active inquiry and educational change will require higher levels of support, but equally important, it will require redoubled commitments to organizing research in collaboration with those seeking improved educational practice in learning institutions.

"It may well be that the most important learning in schools is conveyed implicitly through what some educators refer to as the 'hidden curriculum,' the unspoken messages and invisible structures that underlie the learning process."

The diversity of school populations makes it imperative to realize that some students and cultural groups have greater access to the prevailing structures of learning and knowing in schools than do other groups in society. It may well be that the most important learning in schools is conveyed implicitly through what some educators refer to as the "hidden curriculum," the unspoken messages and invisible structures that underlie the learning process. Successful students are well attuned to the nuances and agendas of the classroom because the cultural contexts from which conventional instructional practice emerges closely match their

own, but many students do not pick up the messages and have no access to the underlying principles and procedures that often promote achievement. This is a real dilemma, because if practitioners make the structures supporting tacit learning more visible for every student, they take away many of the opportunities for discovery in the learning process. Without a significant element of tacit learning, the curriculum becomes teacher-proof, mechanistic, and routine. Researchers and educators must discover ways to make the purpose and organization of thinking activities available to every student without making the discovery process unsatisfying.

As part of this challenge, a critical task is to make visible to various communities involved in the educational process the alternatives available for instructional practice, and to bring those alternatives into public discussions in an informed and positive way. Research has a special role to play in meeting this challenge, for it can help not only in exploring the alternatives that exist for learning and teaching, but in communicating across gaps in understanding and between groups of people.

Second, a major investment is needed, even beyond currently expanding commitments, to develop new forms of educational assessment that can help to support and improve instruction, explore the social contexts of learning, and foster a rich view of thinking and creativity.

Many researchers are deeply concerned about the chasm that has opened between the world of standardized tests and learning processes within school and beyond. National education goals, necessary and good as they may be, serve to magnify this concern. Public officials understandably seek an increasingly uniform and prescriptive system of indicators to represent the outcomes of schooling. More and more researchers, however, are intent on calling into question the value of information being produced. Proposing alternative constructs, they seek strategies that will harness tests to the improvement of learning processes, instead of the other way around.

One way of grasping the urgency of the problem is to look at the issues of standard-setting and test-taking in relation to the future we would most like to inhabit as a society. We want our children to be citizens who can construct meaning, take initiative, develop strategies for solving problems, formulate objectives and act to achieve them, reach a consensus in complex systems of shared cognition, and evaluate novel situations and turn obstacles into opportunities for improving their lives. Therefore, we will find it increasingly untenable to rely on tests that presuppose standardization and uniform response across all contexts, situations, thinking activities, and kinds of people.

"If we want our children to be citizens who can construct meaning, take initiative, and respond to unfamiliar problems in unconventional ways, we cannot rely on tests that presuppose standardization across all contexts, situations, thinking activities, and kinds of people."

The current trend in research on testing takes educational assessment closer to the ways people think and learn, not to what is convenient for those who make tests or policies. New developments in testing should continue to explore different settings and media, such as collaborative learning and portfolios, instead of only trying to make universal judgments about individual students performing in isolation with predetermined subject matter or skills. Educational testing has the potential of becoming more attuned to the processes, situations and contexts in which learning takes place.

RESEARCH IN PRACTICE:
Testing

Research has fundamentally changed the nature of testing and will be used to develop new forms of evaluation most appropriate for future needs.

For a long time, educational testing was simply a sorting device, determining how students compared with each other on standardized examinations and selecting out who should go to college. The principles and practices of testing developed from 1918 to the 1960s were largely refinements of the sorting and selection process. But as educators realized society had to create opportunities for every student rather than select out a small segment for higher education, researchers began focusing more on the psychology of learning rather than psychology of individual differences. They began developing new forms of tests and test questions to ascertain what young people know and can do.

The federal government was a significant force in designing these tests. Congress authorized the National Assessment of Educational Progress (NAEP) to discover which proportion of students learn what they are expected to learn.

NAEP, a survey of the educational achievement of American students, does not rank individual students on a continuum but reports findings in terms of the percent of each population group able to perform the exercise.

In 1988, Congress authorized a new dimension to NAEP, supporting voluntary state-level assessments in 1990 and 1992. The results will be used to provide comparable results to the nation and among states in eighth grade mathematics in 1990 and fourth-grade mathematics and reading in 1992. Some 37 states participated in the 1990 trial state assessment and at least that number will participate in 1992.

In recent years, NAEP has developed numerous innovations that will significantly affect testing in the future. These include: assessing mathematics performance with and without the use of calculators; using open-ended items; assessing mathematical estimation and higher-order thinking skills; portfolio assessments in reading and writing; oral reading assessments; and allowing examinees to choose a selection from a compendium of short stories for the reading assessment.

Testing should actively support instruction; it should become more integrated with teacher judgments and student learning. Tests should contribute directly to what schools are trying to achieve. They should help students to become aware of tacit as well as explicit procedures of learning, making visible the cognitive and experiential processes being taught as students learn.

Teaching can be improved and learning can be enhanced with improved testing. The technology of such tests should include the capability of assessing the whole unit of teachers and students in the class, and of viewing them coherently as an engaged learning community in action. This is the kind of information we need for improved school effectiveness. Testing should work in common cause with educational strategies aimed at stimulating engaged learning among students.

The value of such strategies will continue to become more apparent with the increasing proportion of minority students and recent immigrants in American schools. For those students, the instructional relevance of testing is quite often paramount to school survival. Some recent research on testing and minority students has looked carefully at patterns of test errors to make better use of the learning strategies of students. Such research holds forth the prospect of employing test information not just to make judgments for selection, tracking and promotion, but to figure out ways of helping students instructionally. Testing can lead us to a deeper understanding of how students learn and a greater capacity to help them succeed if the aim is diagnostic and fundamentally encouraging to growth.

Some of what needs to be accomplished can be done through continuing refinement of current forms of testing, systematically expanding the range of what tests can measure. But to do this, we need better ways of describing learning situations, processes, and outcomes, which are only weakly engaged with the present technology of psychometric testing. One of the researchers who created standardized testing for American school populations during the early years of the twentieth century once said that we just need to know how high the wall is, not whether it is made of brick. Today the problem is that we do need to know what the wall is made of: we must find out what teaching and learning are made of, how they develop, how they succeed when they do.

Research and experimental work should be supported to advance this effort. To make any progress along these lines, we must learn new ways of sampling the learning situations in which productive instruction is taking place. Researchers and teachers working together to this end will need resources not only to build assessments for use as part of instructional processes, but to test them out in different contexts and configurations of instruction.

"Testing can lead us to a deeper understanding of how students learn and a greater capacity to help them succeed if the aim is diagnostic and fundamentally encouraging to growth."

"Researchers and teachers working together will need resources to build assessments and to test them out in different instructional contexts."

One strategy for experimentation, in light of the pervasive use of standardized testing in schools, would be to negotiate with administrators and policy makers for "set-asides" for new testing programs. Districts would be given a policy exemption to experiment with new testing procedures along with the resources needed to develop new tests. The idea would be to bring together university-based researchers with specific cooperating districts and schools. The results of the testing experiment could then be used to stimulate further development of assessment technologies in other districts and schools. New measures developed in this way should be appropriate for different kinds of students, so that assessment properly engages the diversity of school populations.

Educational assessment is one of the greatest opportunities facing the research community. A central problem for educational policy in the future will be how to raise standards for the whole system while incorporating variant learning strategies and contexts into that system. Educational testing must be more deeply understood and its limits more thoroughly explored if we are to meet the challenge of improving education for all citizens.

Third, more research is needed on the educational opportunities afforded to members of historically under-served, "minority," and impoverished groups, on the implications of their social and cultural contexts for learning, and on the institutional arrangements that prove most effective in expanding educational opportunities for such groups.

Over the past generation there has been considerable attention paid to improving the educational opportunities of people identified variously as disadvantaged, at risk, underprivileged, and under-served. More important than the labels is the challenge of providing adequate learning experiences for people whose educational needs are not being met. As schooling populations become increasingly diverse, as is certainly happening now in this country, the challenge increases in intensity, and the knowledge needed to meet it adequately will increase in value.

"We must continue to study the mismatch between group cultures and conventional interactions in school classrooms to discover ways of aligning schools to the learning dispositions of different social groups."

The research community as a whole firmly stands behind the assertion that all children can learn, though not necessarily in the same ways or at the same rates. The obvious question that flows out of this assertion is that if all children can learn effectively, what can we do to support it adequately with the knowledge and resources to make sure that it happens?

Generally speaking, research on populations with the most pressing educational needs is shifting from the explanation of school failure to searching for better solutions to educational problems. We need to work harder as a society to discover the contexts and supportive structures that might help to construct solutions. Many disciplines and fields of study are involved in this quest, along with policy analysis and professional development in the field of education.

To illustrate the current challenges facing researchers and their relevance to policy, a significant line of research has identified the mismatch between group cultures and conventional interactions in school classrooms. Building upon that research, it is important to go on and discover ways of aligning schools to the learning dispositions of different groups in society.

Another line of research at the present time is exploring ways of designing new classroom activities and new structures of interaction in the learning process. The aim is to help children from minority backgrounds to advance more rapidly and successfully in the overall cognitive agenda of schooling. It is important now to move beyond theoretical constructs to bold experimentation with classroom structures that work, so that schooling for the groups in question can be enhanced.

Out of such research, conducted on a much larger scale than at present and across several disciplines, there should arise a deeper, more illuminating knowledge base on minority populations and their educational needs. Such knowledge is crucial to the improvement of urban schools; and without it, the attempt to bridge the gap between home cultures and school performance will be doomed to fail despite the most creative policy interventions.

Building upon such information, it should be possible to move away from an overemphasis on the identification of at-risk students to a more concentrated effort toward programmatic improvement. The importance of such development was underscored by one of the respondents to our survey who wrote that the most pressing problems of the coming decade in education will center on schooling children labeled as educationally disadvantaged, economically disadvantaged, and "at risk" of school failure.

To help such children, this respondent continued, we need more studies that attempt to understand the kind of knowledge the children bring to school. And we must learn to experiment with new approaches that can help the school to build upon such knowledge, identifying the strengths of disadvantaged groups so that through them they can achieve greater access to learning.

As part of this agenda, we need more research to develop an understanding of the basic processes by which children acquire language and literacy skills, with an emphasis on more basic research and on the broader social and economic issues that face minority students in this society. Such research needs to move beyond specific program mandates such as desegregation, bilingual education and compensatory education, embracing larger dimensions of socialization and aspiration among minority students.

It was remarked more than once in our discussions that the conventional understanding of minority populations and their needs is insufficient for creating enlightened educational

"Conventional understanding of minority populations and their needs is insufficient for creating enlightened educational policy and designing effective organizations."

policy and designing effective organizations. It will be important to learn more about the variability of students within social groups, not merely to generalize about groups and their needs. The tendency of research as well as educational policy has been to treat groups as if they are homogeneous. To create educational strategies more attuned to the needs of young people from different backgrounds will mean learning more about the differences within groups. Such differences, once understood, will become important in teaching, mentoring, counselling, and promotion to new opportunities in education and work.

"We need to study different learning approaches in the actual contexts where children learn, particularly in urban areas, where the learning process faces numerous impediments."

The process of studying such differences must be carried on in full view of the settings in communities from which students come, noting the social and economic contexts that give rise to educational need. Against this background, we must seek to learn more about how teachers achieve positive results in places where strong student resistance and alienation are present. The precise nature and success of different learning approaches needs to be investigated more effectively in the actual contexts where children learn, particularly in urban areas, where the learning process faces numerous impediments.

A major opportunity exists right now for the study of Chapter I programs that work to expand the range of interventions in American education so that they embrace the learning dispositions and aspirations of children considered to be at risk of dropping out. Despite the enormous expenditure on Chapter I, the nearly $4-billion dollar federal effort in compensatory education, there is insufficient funding for research on the educational needs of children in poverty and on improving the educational services provided to them. Some priorities in this area, though there are certainly more, would include:

- Research on ways of enriching instructional methods used in Chapter I programs to move beyond rote, mechanical learning.
- Studies on how to incorporate curricular advances in school subject areas, particularly science and mathematics, into programs for disadvantaged students.
- More classroom-based studies to probe applications of new ideas and principles in various kinds of schools and for different kinds of students.
- Organizational studies to link ideas for instructional and curricular improvement with the restructuring of schools and of school-community relations in areas where large numbers of minority students are affected.

"Research in fields such as cognitive science, anthropology, sociology, and the study of education need to be brought together for developing a more comprehensive understanding of populations with pressing educational needs."

There also needs to be continued research on alternative education models that work for such students, wherever they may live. Disparate strands of research in fields such as cognitive science, anthropology, sociology, and the study of education need to be brought together for developing a more comprehensive understanding of populations with pressing educational needs.

From another angle, we need to know more about the thinking, understanding, and instructional approaches of teachers who are successful in teaching disadvantaged students. More research is needed that can illuminate this success within the classroom environment and among schoolchildren, showing how teachers work with diversity to create positive educational outcomes. We also need more work on school leadership and community participation to show how they can reinforce the learning process. Much more work is needed on the effective organization of instruction in multicultural settings, which characterize most of our urban schools today. The purpose should not be to advance one version of the curriculum—or to promote its ideological opponent—but to understand more deeply how people learn and what steps are most successful in carrying them forward toward their goals. Similar work is needed in the preparation of teachers and administrators, particularly inquiries showing what alternatives will work best in creating the teacher force for tomorrow's school populations.

Finally, school-wide and system-wide models of effective schooling for under-served populations are a high priority on the research agenda of American education. At the school level, research is needed not only on the status quo of urban education, but on the progress of promising experiments and reforms. We encountered numerous examples under way in the work of the project. The task now is to maintain a sufficient base of continuous funding to make

RESEARCH IN PRACTICE:
Student Retention

Research conducted in recent years on grade retention has led educators to make the connection that holding young people back in school holds them back in life.

According to several studies, students retained in kindergarten are more likely to drop out than their peers, and children who are over-age for their grade have a much greater likelihood of dropping out of school.

Researchers have supported the view that students should be encouraged to master ideas and concepts rather than be held responsible for their failure on specific skills. They argue that retention is an early form of tracking—sorting out achievers from those students with perceived problems and segregating the two groups.

In addition, while most states have introduced early testing, researchers have worked to demonstrate that cognitive skills gained by pre-schoolers and kindergartners are difficult to measure and test scores may be inaccurate. Based on the research findings, educators in several states—including Mississippi, North Carolina, and Georgia—have already abandoned early standardized tests in favor of what they consider more developmentally appropriate curricula.

it possible to understand over the long run what effect such interventions have on the culture of the school and its ability to change in positive ways.

At the system level—districts, cities, states—more work is needed to discover ways of creating governance structures and evaluation systems that will be fully supportive of the diverse forms of learning needed to educate minority populations. It will be necessary to look carefully at institutional practices that might create unfair advantages for students, such as information or incentives presented in forms more accessible to certain groups. Research can help make such patterns clear and devise strategies for overcoming unsuccessful or limiting practices.

During a focus group the project held on the subject of disadvantaged students, one of the participants remarked that we are now at a juncture in this society when it is vitally important to make a difference on this issue. There is a window of opportunity for making changes, and the moment will not last. The cost of failing in this endeavor is unacceptable—indeed, it would be deeply inimical to the future we are capable of building. Research can help to show the way in making use of current opportunities for educational improvement, and this is a propitious moment for such help because it comes at a time when people are listening and looking for alternatives. But research must frame its message as closely as possible to changes that can make a difference, while also building a better base of information to create understanding for the actions that must be taken.

"Will our era create policies that move more towards containment and incarceration for children who fail in school, or towards better mobilization of their potential and more open structures for showing them opportunities that exist in this society?"

Another participant in the same group remarked that we are at a critical juncture in another respect. Will our era create policies that move more towards containment and incarceration for children who fail in school, or towards better mobilization of their potential and more open structures for showing them opportunities that exist in this society? Research cannot alone answer this question, but it is necessary for devising the answer that will best suit us as a democratic people.

Fourth, a leading priority in this era of reform is research into the social organization of schooling and other educational institutions. Such studies are part of a promising strand of developing research and applications, but more is needed to clarify how learning is—and could be—organized, both within school and beyond.

How do schools reflect, disengage from, and adapt to the social and political environments in which they operate? For genuine reform to take place in American schooling, it is crucial that we understand the organizational processes of schooling in relation to the educational goals set for schooling by American society and the political system. But the opposite is also true: In this era of restructuring and reform, we cannot grasp the reality of schools only by

looking at goals, reform ideas, and policy changes. We must also attend closely to the organizational processes of schools and of instruction where the educational process is occurring.

For researchers, the prospect of reorganization of schooling has great promise for the dissemination of innovation and more widespread use of research in practice. Cooperative learning and other new methods of instruction and classroom management designed by researchers in collaboration with practitioners, for example, may require alternative organizational structures to be successful.

"For researchers, the prospect of reorganization of schooling has great promise for the dissemination of innovation and more widespread use of research in practice."

We need to understand how schools function as workplaces and to develop a coordinated strategy, a design of research that moves from teacher to classroom to school to district to larger entities beyond the district level, each linked purposefully with the others to allow multiple analysis and comparisons.

Such a strategy needs to link observational research with survey research and broader comparisons of the sanctions and values that buttress educational systems in this society. Within an even broader perspective, such studies need to be comparative on an international level, looking at our solutions to the problems of educational policy and practice in relation to the alternatives present in other nations and educational systems.

In particular, we need long-term, systematic investigation of how the organization of schooling as a workplace for teachers varies from setting to setting. We need to know much more about how such variations affect both teaching and learning. The goal of such research is to understand the organizational processes that go into school effectiveness. Findings should embrace not only the organization of schools but such issues as selectivity and promotion, institutional rules, diversity of student populations, allocation of time, organizational structures and sequences for transmitting school knowledge, and other work place issues that shape the instructional process.

"Findings should embrace not only the organization of schools but workplace issues that shape instructional process such issues as selectivity and promotion, institutional rules, diversity of student populations, allocation of time, organizational structures and sequences for transmitting school knowledge."

To understand the relationship between the organization of schooling and that of instruction—what one of our focus group participants called the "social organization of instruction"—it is vital that the federal data bases be expanded so that they integrate more non-individual factors regarding the educational process. Much more perspective is needed on the workplace of teachers, the community background of students, and other contextual information as a unit of analysis in the statistical surveys. One suggestion that arose in the discussions of the project was that a task force be convened at the national level to explore the strengthening of data collection on a nationwide basis in the directions just mentioned.

Specifically, it will be important to conceptualize the broad data-gathering effort on instruction and to build a policy initiative for redirecting federal data gathering in this

direction. It will also be useful to look at federal research policy from this standpoint, especially the question of why systemic studies are generally not possible under existing funding arrangements and data collection, which emphasize individuals as the unit of analysis in judging school effectiveness.

Research can help to clarify the process of how decisions are made on instruction and curriculum, and it can point to the kinds of information that are needed to inform such decision making. Research is needed, moreover, to look at the complex interaction of higher levels of governance and local school practice. A high priority right now is the study of the effects of school restructuring upon instruction and the performance of schools. But this need should not be allowed to overshadow the growing demand for more research into the actual dynamics of classrooms within schools as complex organizations.

"Research can help clarify the process of how decisions are made on instruction and curriculum, and it can point to the kinds of information that are needed to inform such decision making."

What happens in classrooms, for example, to teachers and students within the increasingly prescriptive and legislated context of formal instruction? What are the effects of governance and shifts in educational priorities on the curriculum of schools, and on what knowledge is transmitted? What new relationships are emerging between the personal traits of teachers and students and the new organization of classrooms in restructured schools, and how is teacher decision making affecting the outcomes of schools as organizations?

Always a high priority in the study of schools is the need to validate alternative and innovative educational programs designed to be more cost-effective than present delivery systems. But we must also broaden research activities beyond evaluation and assessment data on measurable cognitive change in students. We need much better work on the school as part of the community, the deeper value structure of the school in relation to the expanding experience and competence of students, and a better sense of how schools transmit cultural values.

"As school populations have become more diverse and the performance of school systems more seriously in question, the challenge to researchers, policy makers, and educators is more daunting and more important."

All of this is only to say we need to know more about the process of schooling and the organization of school instruction, but that task has become more daunting and more crucial as school populations have become more diverse and the performance of school systems more seriously in question.

Some other intriguing possibilities along these lines can be summarized as follows:

- Studies that compare schools in the same district that serve differently composed school populations, with attention to variation in the educational treatments of students and their subsequent attainment.
- Studies that investigate differences in the operation of school districts that serve similar kinds of student populations, making strategic between-district, between-school, within-school and across-school comparisons to understand the effect of different of organizational variables.

- Investigation into current constraints of the classroom and school organization that allow much less experience with inquiry and exploratory learning than is called for by the challenging skill development of curricula in the higher grades.
- Studies of comprehensive approaches to schooling that encourage the re-engagement of at-risk youth, focusing on the ways that schooling organizations incorporate parent and community involvement and relate them to the development of new decision making models for schools.
- Research on academic ethos and improving the values of schools, the nature and health of relationships among staff, students and parents, and discovering valid means of measurement and ways of changing the prevailing conditions of schools.

These are among the many research questions that present themselves in an era of dramatic change in educational institutions. To carry out any agenda along these lines will require more cooperative endeavors between researchers, school districts, and communities. It was often remarked by survey respondents that we need more research that recognizes the knowledge and creative strength of teachers. There is a corollary need to use our growing knowledge of schools to foster collaborative rather than adversarial relationships between administrators, teaching staff, students, and the community.

"We can use our growing knowledge of schools to foster collaborative rather than adversarial relationships between administrators, teaching staff, students, and the community."

Better research is needed on the impacts of state and local school policies on the learning process as organized within local schools. We simply must know more about institutional change in order to pursue it in enlightened ways — which means we need research at greater depth to explore the arenas in which school autonomy is most critical but must be balanced with external control.

Fifth, there need to be stronger connections between research and teaching. The agenda for the research community in this area is no less urgent than the ever-present need for good teaching in our society. It is not an ivory tower agenda; to pursue it with vigor could redefine the roles of researcher and teacher alike. The watchwords are communication between researchers and educators, backed by sustained collaboration.

An interplay of theory and practice is critical to the success of all efforts to improve education, alongside systematic inquiries into instructional effectiveness and professional development among teachers.

Along with learning itself, teaching lies at the heart of the educational process. Without improved teaching, the goals of student engagement and higher levels of academic achievement will recede in the distance, perennially unattainable. Teachers are the front line of constructive change in education.

"At the present time, research on teaching is not organized effectively to inform changes in educational policy and practice."

At the present time, research on teaching is not organized effectively to inform changes in educational policy and practice. Yet there are dramatic efforts under way to integrate research, policy, and practice more closely, such as:

- The National Board for Professional Teaching Standards and the assessments it is designing.
- Efforts to improve teacher education through systematic reform based on research, including a concerted effort to move the preparation of teachers more closely to sites of educational practice and involve lead teachers in the schools more closely in the training of teachers and their induction into the profession.
- Policy changes to give teachers greater authority in making decisions within schools, coupled with strengthened commitments to periodic assessment of teacher performance.
- Collaborative projects to involve researchers more directly in the life of schools and to provide teachers with opportunities to engage in research.

"The 1990s will be remembered as a decade of sweeping reform in the teaching profession, but research is needed if reforms are to move ahead successfully."

The 1990s will be remembered as a decade of sweeping reform in the teaching profession, but there is a research agenda that needs to be confronted if such reforms are to move ahead with the information required for success. What knowledge and skills are needed for teaching in the different school subject areas? What institutional changes will be required to produce the teaching force of the future? What assessment technology and professional standards can discern competence in the teaching profession? What is the best way to train teachers, how does this relate to other stages of education for prospective teachers, and what can be done to provide optimal incentives for highly qualified students to enter the profession? What can be done to increase the racial and ethnic diversity of the teaching profession? What forms of professional development and leadership opportunities can best guarantee the levels of productivity, satisfaction, and remuneration that will keep teachers in their careers and reinforce their interest in activating the learning experiences of schoolchildren?

Research can play a strategic role in linking policy discussions with the realities of teaching and learning. As it is now, the two are often on skew lines, not well aligned for constructive action. Part of the problem is an absence of persisting cooperative relationships between researchers, policy makers, and the people who work in schools.

"What we find in research and in policy is a series of disconnected snapshots leading to actions often at cross purposes."

As a result, there is not enough sequence and follow-through on promising ideas, and there is little feedback to deepen the dialogue in research studies as they relate to the people who work in schools. Instead what we find in research and in policy is a series of disconnected snapshots leading to actions often at cross purposes.

The antidote to this situation is three-fold:

- Wider communication and collaboration between those who currently conduct research and the broader population of teachers and practitioners who are the day-to-day decisionmakers about education.
- More sustained support of research strategies tied to large-scale attempts to improve educational practice in American schools and communities.
- Consensus-building panels and other forms of deliberation to look at the interaction between different strands of research on teaching, and to press for integrated concept development that will support improvements in policy, practice, and public understanding.

The process of communication we are calling for here is exactly the kind of integrated understanding that should be built around any significant issue in education. The problem is not merely to create good dissemination, but to discover more direct modes of communicating with educational practice through better collaboration with educators themselves.

Because of the cost and institutional complexity involved in conducting good research on teaching, we must look increasingly for paradigms that will cut across subject areas, grade levels, and parts of the educational system. Along the way, it will be necessary to keep in clear focus the relationship between the instructional goals set for schools and the contexts that reinforce or impede their execution, such as the organization of the classroom and the cultures of students and their families.

"The problem is not merely to create good dissemination, but to discover more direct modes of communicating with educational practice through better collaboration with educators themselves."

Other salient topics that emerged in the surveys and discussions of the project were:

- Ways of integrating research on teacher education into pre-service preparation, transitions to the practice of teaching, in-service evaluation and supervision, and continuing professional development.
- Research on the relationship between increasingly rationalized and standardized patterns of curriculum and their effect on the daily lives of teachers.
- More ethnographic research into the dynamics of classrooms, asking what happens to teachers and students in increasingly legislated and legalized contexts, what are the effects of restructured schools on the curriculum and on learning, and what are the unmeasured forms of behavior that are being taught through present schooling practices.
- More inquiry into teaching for understanding and higher order thinking, expanding our knowledge on how different forms of teaching and classroom organization are related to the outcomes of schooling.
- Research on instructional systems that combine print, video, computer-assisted instruction, and recorded sound, along with the traditional role of teachers.

- More studies of how teachers can engage in action research, cooperative curriculum development, peer observation and critique, and other such activities that expand the decision-making roles of teachers.
- Ways of restructuring learning environments so teachers can enhance their own learning along with that of their students, since the former is vital to professional development of teachers and instructional effectiveness.
- Continuing studies of teacher shortages, labor force projections, and alternative strategies of recruitment and retention.

"Nowhere is the pay-off likely to be greater for learners and for this society as a whole than in the support of research aimed at enhancing the practice of teaching."

As a way of summing up the overriding needs in this area, we cannot emphasize strongly enough the importance of high-quality and greatly expanded research to clarify what goes into good teaching and how to sustain it for our highly diverse school populations.

Promising strands of research are available to support reform and improvement in American education. But greater effort is needed. Sustained funding is imperative. Heightened awareness of how to organize such research and ensure its communication to the profession and public life is in order. Above all, a closer relationship between research and the act of teaching can and should be developed.

Such changes in the configuration of research and practice are visible across many educational issues. Nowhere, however, is the pay-off likely to be greater for learners and for this society as a whole than in the support of research aimed at enhancing the practice of teaching, strengthening its connections to active learning for all citizens.

V. AFTERWORD

Lee Shulman, Stanford University
President, National Academy of Education

We live in an age of commissions, task forces and special panels convened to address the enduring challenges of American education. Their recommendations are often cogent, well-conceived, and on point. As proposals stack up, a quiet, nagging question persists. How do we know that these many ideas are as sound as they appear? Once theories evolve into policies and policies are transformed into programs, can carefully conducted evaluations reveal whether a program works, for whom and under what conditions? Or are we restricted to solving educational problems through political debate and impassioned oratory alone?

The National Academy of Education is committed to the role of educational scholarship to enlighten educational practitioners, policy leaders and the general public regarding the process of education and the accomplishment of its ends. Comprised of scholars and educational leaders, the Academy has often been asked to examine fundamental questions of American education during its twenty-five year history. Two years ago, we were encouraged by both federal officials and foundation executives to help the nation chart its future course in education research. With financial support from the Carnegie Corporation of New York, with leadership from co-chair Michael Kirst and Diane Ravitch, and with the extraordinary talents of Thomas James as executive director, the Academy's commission on Education and Public Policy took on the task of evaluating, through systematic surveys, interviews, expert panels and deliberations, what should be the immediate future of research in education. Who should conduct the research, at what levels of funding, and most important, what are the highest priority problems for investigation?

Why should the Academy's report be taken seriously? The views expressed in this volume reflect the convergence of many perspectives. A broad array of individuals and institutions was surveyed to solicit their views. Position papers were commissioned from leading scholars who subsequently met in day-long focus groups to discuss their recommendations. A superb and diverse committee of Academy members met to lay out priorities for the inquiry, and subsequently provided critical examinations of each successive draft of the report. Moreover, the report is timely. It comes on the heels of the President's America 2000 reform plan and highlights the indispensability of a coordinated strategy of research and development

if national educational goals are to be achieved and the nation is to learn from the experience of pursuing those goals.

We direct this report to several audiences. To federal and state policy makers, directors of research agencies and legislative leaders and their staffs, we offer a conception of research problems and principles for managing programs of research support. To the directors and staffs of our large and small private foundations, we suggest a re-ordering of fundamental funding priorities. To our colleagues in the research and educational practice communities, we communicate a vision of research programs that can be pursued and educational practices that might result from them.

The Academy report contains many findings and recommendations. I shall comment on only a few. First, we recommend a more vigorous federal role in the support of research on education. Some may fear that a greater government role will guarantee even more politicization of educational research agendas. While always a danger, I would remind readers that the U.S. is unique among the nations of the world in the high proportion of its research and educational innovations funded from private sources, both corporate and foundational. With this mixed source of support, and the kinds of safeguards we have recommended in the report, excessive politicization can be resisted, though never entirely eliminated.

The generosity of America's many foundations is one of the glories of our nation's public service and educational efforts. But we implore our great foundations to examine their funding policies and to recognize that education research has typically been shunned by foundations as they opt to invest their resources in action programs of direct service. Those few foundations that have chosen to invest in research on education—and they are named and discussed in the body of the report—have fostered significant new understanding and insights about education and its underlying psychological and social processes. A courageous commitment to research and evaluation is needed from the vast majority of foundations to complement and enrich government initiatives.

Significant education research takes time. Policy leaders recognize that building a superconducting supercollider will require a decade or more of experimentation and development. Research for complex weapons systems like Star Wars require equally long periods of time. Yet there is little patience with the needed durations of complex education research. Human behavior and human organizations introduce a complexity that far exceeds the vagaries of electrons or lasers. We need funding initiatives that will appreciate the reality of analogous time frames to address enormously difficult research questions such as learning processes among culturally different groups or organizational change in our enormous secondary schools.

Teachers and other practitioners must increasingly become the focal points of the research enterprise, playing multiple roles as collaborators, consultants, participants and active interpreters of research findings. Images of teachers as passive recipients of researcher-led dissemination programs must be replaced with new models of collaboration and active teacher-led brokering.

There are no quick cures for our educational woes, no guaranteed money-back promises. Educational change will emerge from thoughtful inquiries, carefully conducted and sensitively interpreted. We must stop innovating out of expedience, ignoring our obligation to study the consequences of our efforts and to understand the dynamics of the programs we introduce. We are like the patient who forgets his experience a few short minutes after undergoing it. Our educational system suffers from amnesia and blindness. Neither successes nor failures are properly documented or understood. With properly funded and conducted programs of education research, American education can finally come to its senses.

VI. STUDY DIRECTORS

MICHAEL KIRST, co-director of the NAE's Project on Funding Priorities for Education Research, is professor of education and business administration at Stanford University. The author of *Schools in Conflict* (1989) and *Who Controls Our Schools* (1984), Kirst is considered one of the nation's foremost education policy specialists. A member of the National Academy of Education, Kirst has held key policy positions in Washington, D.C., and in California, where he co-directs Policy Analysis for California Education (PACE) and was a former chair of the California State Board of Education. Kirst was associate director of the White House Fellows Program and the National Advisory Council on the Education of Disadvantaged Children. He has also been staff director of the U.S. Senate Subcommittee on Employment, Manpower, and Poverty, and the director of Program Planning and Evaluation for the Bureau of Elementary and Secondary Education in the U.S. Office of Education.

DIANE RAVITCH, co-director of the NAE project, is adjunct professor of history and education at Teachers College, Columbia University. Ravitch is author of *The American Reader* (1990), *What Do Our 17-Year-Olds Know?* (with Chester Finn, Jr., 1987), *The Schools We Deserve* (1985), *The Troubled Crusade: American Education, 1945-1980* (1983), *The Revisionists Revised* (1978), and *The Great School Wars: New York City, 1805-1973,* (1974). A member of NAE, she has written nearly 200 articles and reviews appearing in major national publications and has received numerous honorary doctorates and awards for her scholarship.

THOMAS JAMES, executive director of the study, was the principal author of *Research and the Renewal of Education.* James teaches in the Education Department and the A. Alfred Taubman Center for Public Policy and American Institutions at Brown University. A historian of education specializing in public policy, James is author of *Exile Within: The Schooling of Japanese Americans, 1942-1945,* co-author with David Tyack and Aaron Benavot of *Law and the Shaping of Public Education,* and editor with Henry Levin of three books on private and public schools. He is now completing a book on social science and education policy in 20th Century America. Besides having served on the faculty at Stanford, Wesleyan, and Brown, James has worked at Common Cause and was associate director of communications at the Education Commission of the States.

VII. THE NATIONAL ACADEMY OF EDUCATION

The National Academy of Education was established in 1965 by a small group of education leaders to foster public understanding of education and to provide comment on and analysis of educational issues to the government.

The Academy is comprised of 75 scholars and distinguished professionals, all of whom were elected to the Academy in recognition of outstanding contributions to education. The mission of the Academy is to "promote scholarly inquiry and discussion concerning the ends and means of education, in all its forms, in the United States and abroad," according to the Academy's bylaws.

Throughout its existence, the Academy has been called upon by governmental agencies and other groups to conduct special studies and reviews in the public interest. These have included:

- *Research and the Renewal of Education*, the 1991 assessment of national priorities for education research;
- The current Congressionally mandated long-term evaluation of the use of the National Assessment of Educational Progress (NAEP) to conduct state-by-state comparisons of educational achievement in reading and mathematics;
- *The Nation's Report Card*, the 1987 review of NAEP chaired by U.S. Secretary of Education Lamar Alexander.
- *Becoming a Nation of Readers: The Report of the Commission on Reading*, the 1985 examination of the vast array of research on how people learn to read and how reading is taught in schools.
- A 1987 feasibility and planning study to examine the work to date of the International Association for the Evaluation of Educational Achievement.

In addition, the Academy also administers an annual Spencer Foundation Postdoctoral Fellowship Program that helps promote sophisticated inquiry about education among junior academic scholars. The program awards nearly $1 million per year in fellowship support, the largest such effort in the U.S.

Lee S. Shulman, professor of education at Stanford University, is president of the Academy. His predecessors include Ralph W. Tyler, Lawrence Cremin, Patrick Suppes, Stephen Bailey, Robert Glaser, and Patricia Albjerg Graham.

VIII. FURTHER INFORMATION

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